The Management of Leveraged Buyout Credits by Bank Credit Functions in Europe

Risk Factors and their Use

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The views and results expressed in this thesis are solely the personal ones of the author and were derived from empirical research mainly conducted in 2012. The author is responsible for any errors.

Abstract

LBO transactions were structured increasingly aggressive in the years prior to the outbreak of the financial crisis (2007), as reflected in rising debt proportions. This was followed by many LBO credits experiencing difficulties to adhere to their loan documentations. Bank credit functions played a role in this, giving rise to an investigation into whether their work could be more effective. To identify areas for improvement in their work of evaluating LBO credits and – if such areas can be identified – deduce some potential measures how to address them was the aim of this research. The research is timely as evaluations of LBO credits continue to be required heavily. Many of the credits structured around 2006/2007 will soon require refinancing and in parallel new transactions come to the market.

A literature review on the risk factors and cycles relating to LBOs, the simple techniques of portfolio management and LBO credit management practices found that all the ingredients required for effective LBO credit management are available. This is in conflict with the observation of increasing credit risk inherent in these transactions in the years just prior to the outbreak of the financial crisis of 2007. Based on this, 18 experts were interviewed. The results were analysed quantitatively and qualitatively. To enhance robustness, results were discussed with four senior credit executives as well as a focus group discussion of the credit function of one bank.

The exploratory results of this research suggest that there is strong awareness of the risk factors in LBOs. The systematic risk in LBOs in form of an LBO cycle however is not considered to a significant degree in credit analysis/credit monitoring. Some important risk factors also receive relatively little attention in credit analysis/credit monitoring and aspects of portfolio management are not used strongly at the level of credit functions. Finally, an area of improvement that had been identified was the utilization of results; i.e. the need to draw consequences from observations made with view to risk factors.

Due to the limited scope of the study, updating the results with more recent data as well validation and triangulation of results remain recommended.

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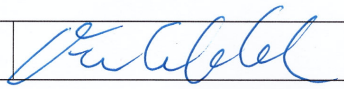
Signature of Candidate:		Date:	10/4/14

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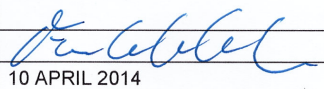
Signature of Individual Submitting:	
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Updated February 2008, November 2008, February 2009, January 2011

List of Abbreviations

A:	Answer (used in the interview field notes)
ACPM	Active Credit Portfolio Management
APFM	Aspects of Portfolio Management
bn	Billions
BSC	Banking Supervision Committee
BVK	Bundesverband Deutscher Kapitalbeteiligungsgesellschaften
C:	Comment (used in the interview field notes)
CEO	Chief Executive Officer
CLO	Collateralised Loan Obligations
CPM	Credit Portfolio Management
CVAR	Conditional-Value-at-Risk
DF	Degrees of Freedom
DR	Default Risk
EBITDA	Earnings before Interest, Tax, Depreciation and Amortisation
EBS	Edinburgh Business School
ECB	European Central Bank
EVCA	European Private Equity and Venture Capital Association
eds.	Editors
e.g.	exempli gratia/for example
et al.	et alli/and others
€	Euro (Currency)

EUR	Euro (Currency)
FSA	Financial Services Authority
GDP	Gross Domestic Product
HLT	Highly Leveraged Transaction/Highly Levered Transaction
HYB	High-Yield-Bond
i.e.	id est/that means
IMF	International Monetary Fund
LBO	Leveraged Buyout
LRC	Leveraged Recapitalisation
M&A	Mergers and Acquisitions
MBO	Management Buyout
Mgt.	Management
MD	Managing Director
mn	Millions
PE	Private Equity
PIK	Pay-In-Kind
PWC	Price Waterhouse Coopers
p/pp	Page/Pages
Q:	Question (used in the interview field notes)
Recap	(Leveraged) Recapitalisation
RR	Recovery Risk
SH	Shareholder Loan

$	United States Dollars
VAR	Value-at-Risk

Definitions

- **Acquisition company**: The company that acquires (either via a shares purchase of purchase of the assets) the Target Company.
- **Aspects of portfolio management**: Some measures of portfolio-management that could easily be utilised with regards to certain risk factors in LBOs. The term is used within this research with regards to the question as to which degree the analysis and monitoring of LBO credits take into account some aspects of portfolio management.
- **Available Free Cash-Flow**: The amount of cash generated by a business from its core activities during a certain period of time less those amounts spent on necessary investments (capital expenditure).
- **Bank debt**: Debt provided by banks, as opposed to other financiers such HYB-Investors, mezzanine investors or shareholder providing loans.
- **Bank of England**: The central bank for the United Kingdom.
- **Business plan**: A projection outlining the planned development of key financial parameters over a time-span of several years. Parameters typically include sales, EBITDA, debt and cash-flow, but also some credit metrics like leverage multiples.
- **BSC/Banking Supervision Committee**: A committee comprising members of the central banks within the European Union and Bank Regulators.
- **Cash-Flow**: The amount of cash generated by a business during a certain period.
- **Category**: A collection of qualitative answers that could be summarised by one headline.
- **Collateral**: Security provided or pledged as protection against a loan.
- **Credit analysis**: Analytical work that is performed as part of a new LBO exposure to be entered into or the evaluation of a major amendment of an existing exposure.
- **Credit authority**: A delegated competence to take decisions with regards to credits within certain limits.
- **Credit duration**: A measure of time to evaluate the time required until half of a credit has been repaid. The measure is typically used in the bond market to measure the sensitivity of a portfolio to interest rate changes. Within this research, it has been suggested for use as a measure of the increasing aggressiveness of an LBO cycle.

- **CLO**: A debt instrument that is serviced from a portfolio of underlying loans (in this case LBOs). The instruments are split into several tranches with different repayment profiles and interest rates.

- **Credit management process**: Refers to all the activities by credit functions, in particular to the credit analysis, credit monitoring and the degree to which these take into account aspects of portfolio management.

- **Credit monitoring**: Analytical work performed as part of the regular review process of LBO credits.

- **Credit opinion**: An assessment of the credit risk in LBO transactions, typically culminating in a recommendation for the further treatment of credit.

- **Credit Risk**: Default risk and recovery risk.

- **Credit risk profile**: A description of the aggregate credit risk of a bank based on certain criteria.

- **Deutsche Bundesbank**: The central bank of the Federal Republic of Germany.

- **Debt composition**: A term referring to how the total debt is subdivided by instruments, investors, etc.

- **Debt load**: A term used to describe the total debt present in a capital structure, measured either in the form of a leverage ratio or provided in absolute measures.

- **Deductive approach**: Explaining a phenomenon by first forming assumptions about its causes and effects that are transferred into testable hypothesis to be then tested.

- **Default rate**: The relative frequency by which borrowers categorized by a certain criteria (e.g. the type of credit, such as LBO) have failed to meet their contractual payment obligations within a certain time frame.

- **Default risk**: The risk that a borrower in an LBO transaction is unable to meet its financial obligations in the contractually agreed manner.

- **Degrees of freedom**: A concept applied in statistical hypothesis testing. It represents the number of variables or group of number of variables that can vary independently without changing the overall result of a computation.

- **Distribution free tests**: A series of statistical tests used to evaluate similarities between distributions of data where the data is not normally distributed. The tests are suitable for data of ordinal level. These tests are also known as non-parametric tests.

- **EBITDA**: A measure of profitability used frequently by practitioners that is close to cash- flow as it uses the operating earnings before interest, tax and depreciation.

- **European Central Bank**: The central bank for the Euro-zone. Its main objective is to ensure price stability within the Euro-zone.

- **Event of Default**: Certain performance criteria of the borrower, including but not limited to the punctual payment of interest and principal, which if violated entitle the lenders to declare a loan due and repayable.

- **Federal Reserve**: The central bank for the United States of America. Also abbreviated as 'Fed'.

- **Financial Distress**: A situation where a company has difficulties meeting its contractual obligations under its credit contracts. Typically this is the case when payment obligations cannot be met, but also violations of other obligations – such as adherence to financial covenants – can cause a situation of Financial Distress.

- **FSA**: Financial Services Authority – the former UK authority in charge of supervising the Financial Services Sector in the UK. The FSA has been separated into two different authorities, one being the Financial Conduct Authority and the other one the Prudential Regulation Authority. The latter one has the role of a supervisory authority to banks.

- **Firm level recovery rate**: The recovery rate achieved by all lenders on an average (weighted) basis. This is distinctly different from the instrument-level recovery rate which measures the Recovery Rate for certain components of the debt structure.

- **Financial covenants**: Contractually agreed financial ratios to which the borrower needs to adhere to during the life of a credit or an obligation not to incur additional debt exceeding certain threshold levels. A violation of these obligations constitutes an Event of Default.

- **GDP**: Gross Domestic Product. Technically the value of all the goods and services produced within an economy within a certain timeframe. GDP is used as a measure of overall economic activity.

- **High-Yield-Bond**: A bond issued by an issuer that has a sub-investment grade credit rating.

- **High net-worth individuals**: Individuals that hold significant financial resources to invest.

- **HLT**: Highly Leveraged Transaction; a term used to describe a transaction that to a substantial part employs debt in its capital structure. Sometimes the term is used as a synonym for LBO.

- **Inductive Approach**: Looking for the causes or effects of a phenomenon without any predetermined assumption regarding the causes or effects.

- **International Monetary Fund (IMF)**: A supranational institution with several objectives related to global finances, including financial stability.
- **Industry state**: The overall financial condition of a group of companies within one industry.
- **Interpretivism**: An approach to research that allows the researchers' own view and observations to influence results.
- **Junior debt**: Debt that ranks below senior debt (bank debt), typically by way of structural subordination (i.e. the debt of the banks is closer to the operating assets) and/or by contractual subordination (i.e. in a contract the holders of the junior debt agree to restrictions regarding their rights prior to senior debt having been fully repaid).
- **Jurisdiction**: The country whose legal system would be primarily applicable in the case of financial distress or bankruptcy.
- **LBO**: The takeover of a company under the control of a PE-firm, where the purchase price is largely paid by debt and where the underlying cash-flows of the company acquired are the main repayment source.
- **LBO cycle**: A pattern by which activity in the LBO market follows pronounced cycles that show certain characteristics (i.e. development of purchase prices) and which may repeat themselves over time. The overall assumption is that at peak times, LBO transactions exhibit higher credit risk.
- **Leverage**: Describes the share of debt in the overall capital structure of an LBO transaction. Frequently, this is measured by the ratio of debt/ebitda, but other measures are used as well.
- **Leverage multiple**: The result of dividing the amount of debt by a financial performance figure, typically the EBITDA or a measure of cash flow.
- **Leverage ratio**: A ratio using the amount of debt and a financial performance figure. The most frequently used is the leverage multiple, but other measures such as debt divided by total capital are also used.
- **LRC**: Leveraged Recapitalisation. A transaction where a distribution to a shareholder is made in the form of a dividend or share-buy-back which is financed via assuming additional debt.
- **Managing Director**: Title used in the financial services industry for those professionals that have significant experience in their respective fields. Most persons with this title are also supervisor/department heads and oversee the activities of larger groups.
- **Operating subsidiaries**: Subsidiaries of the target companies engaged in fulfilling important operating functions such as production, marketing, distribution, etc.

- **Overall state of the economy**: A measure of the performance of the economy relevant to an LBO transaction, normally measured as GDP growth.

- **PE-Firm**: A firm managing a private equity fund, including investing the funds resources in LBOs and monitoring the performance.

- **PIK**: Pay-in-Kind. A term used for financial instruments, where there is typically no on-going cash-interest payment, but where the principal to be repaid at final maturity is increased each period.

- **Purchase multiple**: The purchase price of a business divided by a financial measure. Frequently, the financial measure is the EBITDA.

- **Portfolio-management**: Refers to the analytical work performed to put individual credits into perspective against their peer-group to detect trends and patterns in credit quality. The overall aim of these activities is to avoid concentration risks and the early recognition of deteriorating credits and a deteriorating credit environment.

- **Positivism**: An approach to research where knowledge is generated either by empirical observation or logical deduction. It assumes that research is free of subjective judgment.

- **Recap**: See Leveraged recapitalisation.

- **Recovery risk**: The risk that the amount of principal outstanding and/or unpaid interest that can be recouped once a default has occurred is low; the expected discount on the amount received compared to the principal amount outstanding once default risk has materialised.

- **Recovery rate**: The percentage of the principal of a loan that is recovered in the case that a default risk has materialised.

- **Research aim**: The ultimate goal of a research program to be achieved. This is typically broken down into a series of research objectives.

- **Research instrument**: A questionnaire specifically developed to measure the views of participants relevant to this research.

- **Research objectives**: A specific result, typically one of several, that needs to be achieved to accomplish the research aim.

- **Risk factor(s)**: Certain characteristics of a LBO transaction that are viewed to increase the credit risk.

- **Scoring level**: A numerical expression regarding the importance of a risk factor, its use in the credit management process including the utilization of aspects of portfolio management with a view to this specific risk factor based on a five-point measurement scale of ordinal data level.
- **Secondary buyout/Secondary transaction/Secondary LBO**: An LBO that is being sold to a PE-firm for the second time.
- **Second Lien (debt)**: Debt that has a second ranking claim on the security, which is provided with the first rank for the benefit of senior debt.
- **Senior debt**: Debt that benefits from the highest ranking in the capital structure of a borrower or borrower group. In the case of LBOs, this typically includes the benefits from a first ranking security package.
- **Shareholder loan**: A loan provided to a company by its owners. Such loans are typically contractually and structurally subordinated.
- **Structuring Team**: A team of bankers with specific knowhow in acquisition finance that is tasked to tailor debt packages to LBO transactions.
- **Sponsor**: A term commonly used in the market by practitioners referring to the PE-firm.
- **Sponsor quality**: Refers to the ability of a PE-firm/sponsor to successfully lead an LBO transaction so that a default is avoided and to the ability of the sponsor to provide support (in whatever form) to an LBO transaction if it experiences financial distress.
- **Target company**: The company that the PE-firm intends to take over by way of an LBO.
- **Type of transaction**: Refers to whether a transaction represents a first-time transaction (primary transaction) or whether the business is undergoing an LBO repeatedly (Secondary or Tertiary Buyout) or whether the private equity investor is taking out a special dividend (so-called recap).
- **Tertiary buyout/tertiary transaction/tertiary LBO**: A company that is being sold to a PE-firm for the third time.
- **Transaction Structure**: The composition of an LBO with regards to its entire capital structure and its legal structure.
- **VAR** – Value-at-Risk: A measure of loss that is unlikely to be exceeded within a specified measure of probability.

Chapter 1: Introduction

1.1 Focus of this Research

Takeovers of companies utilizing debt to a significant degree to finance the purchase price with the involvement of a PE-firm, referred to as LBOs, have increased substantially, both in terms of numbers and volume in the years prior to the outbreak of the financial crisis in 2007 (ECB, 2007b). With increased transaction numbers and more banks being active in the field of providing debt financing for such transactions, arguably lending standards became more aggressive (e.g. Deutsche Bundesbank, 2007) As a consequence, many LBO transactions experienced financial difficulties. According to a survey carried out by Price Waterhouse Coopers ('PWC') on 187 PE firms, 75% of the portfolio companies had difficulties complying with their financing agreements (usually via covenant breaches) and had to renegotiate terms (PWC, 2010). More importantly, the survey also reported that there were various instances where funds reported that financial creditors had taken over the controlling stake in acquired companies *(author's comment: lenders typically have a share-pledge on the acquired business*) (PWC, 2010). This research focuses on the contribution of the organisational unit within banks in charge of analysing (LBO) credits, credit functions, where research so far is absent. The key question is whether there are areas for improvement that would make their work more effective.

1.2 Relevance of this Research

In the years prior to the outbreak of the financial crisis (2007/2008), the market for LBOs has seen rapid expansion (ECB, 2007b), which also led to high volumes and numbers of LBO credits. The moving average for four quarters of syndicated loans for LBOs in Western Europe was approximately €8bn in 2001.[1] By mid-2005 the figure was estimated to be close to €29bn and by the third quarter of 2006 it had reached nearly €50bn. In parallel, target companies have been burdened with more debt, transaction structures became more aggressive and contract standards shifted strongly in favour of borrowers (Deutsche Bundesbank, 2007), all of which enhanced the credit risk

[1] Figures approximated from a graph in the Financial Stability Review of the Deutsche Bundesbank November 2006, using data from Dealogic.

in these transactions. The phenomenon had been commented on and warnings issued by many market observers, including central banks, regulatory bodies or supranational organisations. For example, the UK based FSA in 2006 pointed out that there was a significant rise in the amount of lending provided to private equity backed companies (FSA 2006). The International Monetary Fund (IMF) in its Global Financial Stability Review in October 2007 (IMF, 2007, p. 2) used the words *"signs of similar credit indiscipline"*, comparing the development to that in the US mortgage market. Unsurprisingly, the aftermath of the financial crisis that broke out in 2007 and 2008 in combination with reduced economic agility around the globe also affected the performance of LBO credits. Leveraged loan prices saw drastic erosions from mid 2007 (e.g. Bank of England, 2007b) and bonds rated BB and below saw their spreads widening (e.g. ECB 2007c[2], Bank of England, 2007a[3] and 2007b[4]), both indicating a market perception of heightened credit risk. The non-investment grade sector (to which LBOs typically belong) experienced a strong rise in defaults (ECB 2009b) and rating downgrades in the corporate sector accelerated (Deutsche Bundesbank, 2009). In the first quarter of 2009, the amount of leveraged senior loans in distress within the Eurozone was reported at €15bn (ECB, 2009). Banks held the majority of these loans (ECB, 2009). Some remarkable write-downs on exposures had to be digested. Write-downs of major Western European banks (inclusive of the UK) on leveraged loans (of which LBOs are a part) between the second half of 2007 and the first half of 2009 amounted to approximately US$22bn[5] (Bank of England, 2009a and 2009b), which was partly driven by the reduced asset prices of loans held on the books in the absence of syndication options. For a group of 521 LBOs in the US between 1980-2006 (all public to private transactions), a total of 22% ended either in either Bankruptcy (19%) or went through some form of out-of-court restructuring (Ayash, 2013), which further illustrates that LBOs show above average propensity to default.

Although the magnitude of the losses from leveraged loans remains small compared to the overall write-downs incurred as a result of the financial crisis (2007/2008), which

[2] Based on data provided by Thomson Financial Datastream.

[3] Supported by a chart naming Merrill Lynch as source of data, showing global corporate bond spreads by rating.

[4] Supported by a charts naming Merrill Lynch as source of data, limited to Sterling Corporate Bonds.

[5] Figures approximated from graphs in the Financial Stability Reports of the Bank of England as of June and December 2009.

the ECB stated had reached $710bn globally by November 2008 (ECB, 2008)[6], it suggests that credit functions could be more effective in their assessment of LBO credits.

To find out how, potential causes for the observed phenomenon – the expansion against an increasingly aggressive credit environment - need to be analysed. If causes can be identified, they represent an area for improvement and potential measures to address them can be formulated. Also, it might be possible that results can serve as an example for other specialised lending products, where similar issues might be present.

A significant body of research exists on the broad reasons for the credit expansion prior to the financial crisis of 2007. But this is mainly focused on market dynamics and concentrates on the strong liquidity provided by investors in certain segments of the market, including collateralised loan obligations (CLOs). So far little attention has been paid to the work of credit functions, which are in charge of assessing individual credits within banks, including LBO credits. The credit function therefore is one of the many forces that affect banks' credit risk profiles. A survey carried out by the Banking Supervision Committee ('BSC', 2006 in ECB, 2007a and 2007b) showed that the assessment of LBO credits is very detailed. A selective review of the 2006 annual reports (which was the last financial year before the outbreak of the financial crisis in 2007) of a sample of banks active in this segment also frequently describes the analysis as very detailed with a strong focus on risk factors such as covenants and corresponding credit monitoring.

The need for comprehensive analysis and monitoring of LBOs, which also considers specific wider transaction characteristics and aspects of portfolio management, has been recognised for a long time and is by no means just a result of the recent experience. The US has historically been the most active market for LBOs and therefore it comes at no surprise that this is also where critical comments were made early. Already in 1989 the Federal Reserve Bank of Cleveland (Thomson, in its Economic Commentary, no page number) commented on the risk due to significant LBO leverage:

"…it is therefore essential that the lenders conduct a sufficient analysis of the proposed transaction and of the creditor…"

[6] Data used partly from Bloomberg.

"A large part of a bank's LBO portfolio could conceivably go under if interest rates rise dramatically if there is a severe economic downturn."

The testimony recently provided in the financial markets suggests that there still exist areas where banks' credit functions could improve in light of the above. Although with no direct references to LBOs, a statement by Mora (2012, p. 79) in the Economic Review for the second quarter of 2012 by the Federal Reserve Bank of Kansas City also highlights this point:

"The crisis revealed that risk management at banks and other financial institutions had shortcomings"

The academic relevance of the subject can be inferred from the significant research on LBOs in general and also from some emerging research on banks activity. Overall, the capacity of private equity funds has been reported to exceed USD 3 trillion (Ayash, 2013) while it remains controversially discussed whether they actually do lead to improvements in operating performance. For example, Cohn, Mills and Towery (2014) do find evidence that suggests the contrary at least for public-to-private transaction, while others do continue to find a relationship between PE involvement and improvements in operating performance (e.g. Liu, 2013). As LBOs in general represent a large economic phenomenon while at the same time exhibit high leverage, it is important that bank credit functions keep in focus the risk drivers in these transactions. While generally banks claim that this was the case (see 'BSC'), a recent study by Cao, Mason and Song (2010) provides support that lending practices had become weak at least within certain segments of the banking sector during the run-up to the financial crisis. Moreover, they were able to show that those banks that experienced lower write-downs on their loans did reduce their share of the overall LBO lending market and kept their lending standards up.

The research addresses the following **research questions**:

- Are there potential areas for improvement in credit functions' assessment of LBO credit risk?

Provided such areas for improvement can be identified, the related second research question is:

- What potential measures can be deduced from the identification of areas for improvement so that the effectiveness of credit functions' assessment of LBO credit risk is enhanced?

These research questions were transformed into a **research aim**:

- To identify potential areas for improvement in the credit management process of LBO credits by credit functions and – provided they can be identified – to deduce potential measures to address them.

The development of the general research problem and its transformation into research questions, the research aim and its objectives are explained in detail in Chapter 3.

The relevance of this research goes beyond an investigation explaining what has been observed. First, despite some negative experiences during recent years, LBOs must be expected to stay and therefore credit functions will continue to be confronted with evaluating these exposures. There has been a strong historical persistence of LBOs and they have been used in several countries. Transaction structures close to those of LBOs appeared very early around 1900 (Wright et al., 2006); but as a noticeable form of transaction they appeared around the 1980s (Kaplan and Strömberg, 2009; similar to Wright et al., 2006). Originally, they were heavily concentrated in North America[7] and in Europe the historically most active market was the UK, where activity also took off in the 1980s (Wright, 2006; Mehran and Peristiani, 2010). While the UK remains one of the most important markets, accounting for approximately 24% of all European investments in 2011 (EVCA, 2012), LBOs are now present in all European countries (BVK, 2010; EVCA, 2012). Other than the UK, France and Germany are particularly active markets. Also, the relative share of LBOs as part of the M&A market has constantly been on the rise. Globally, LBO activity reached 17% of total Merger & Acquisition (M&A) activity in the peak year of 2006 (ECB, 2007b). This compares to just 3% in 2000 (ECB, 2007b). So purely from a historical or evolutionary perspective, it is unlikely that they would simply disappear after at least 30 years of being an

[7] (Data from Capital IQ for more than 17,000 LBOs between 1970 and 2007, presented by Kaplan and Strömberg, 2009).

important part of the financial markets landscape and a history that goes back even further.

Another reason to expect that credit functions will remain confronted with LBOs is that PE-firms continue to seek for and to invest large amounts of funds. The total investments by European PE-firms in 2011 amounted to approximately €46bn, of which roughly €42bn went into buyouts (EVCA 2012). During the first half of 2012, European PE funds focusing on buyouts raised €4.4bn ($5.5bn; Prequin, 2012) and globally the amount stood at €20.1bn ($25.1bn).[8] LBOs have historically been the by far largest individual investment category (EVCA, 2012) for private equity. This is likely to lead to investment pressure on the side of PE-firms and strong competition in the bidding for potential LBO targets.

Despite pressure to invest, a third driver for more activity is expected to be the pressure to divest and return funds to investors. Some funds have a predetermined lifetime and are required to return cash to investors upon expiry of this period (Deutsche Bundesbank, 2007). This was likely one of the drivers for the never before witnessed number of companies being subject to an LBO as a second secondary buyout (i.e. being sold to another PE-Sponsor (see also Deutsche Bundesbank, 2007; Kaplan and Strömberg, 2009, Bonini, 2012). There was also a trend to even tertiary buyouts and recapitalisations (Deutsche Bundesbank, 2007). The circulation of transactions within the PE industry has constantly increased. The exit route secondary buyout was ranked second in terms of exit forms after strategic buyers, accounting for 24% of total LBO transaction volume in 2007 globally.[9] However, following the outbreak of the financial crisis in 2007 exit opportunities, including the exit via selling to another PE-firm, became temporarily more limited. European PE-firms' exits achieved via a secondary buyouts were only about 8% of total exits in 2009 (BVK, 2011), with write-offs of about EUR 3,6bn being the single largest exit route.[10] But already in 2010, secondary buyouts accounted for approximately 1/3 of all exits by European PE-firms (BVK,

[8] Converted at 1 $ = 0,759 € based on rates as of 30.6.2012.

[9] Data from Capital IQ, presented in Kaplan and Stromberg, 2009.

[10] Figure includes write-offs on growth investments. However, Buyouts are the part PE investments. Figures relate to total exit volumes.

2011)[11]. This phenomenon of such strong activity within the PE industry is yet relatively new as for a longer time horizon, their share was much lower. For example, Ayash (2013) illustrated that within a sample of 183 US public-to-private transactions that occurred between 1980 and 2006, only 10% were exited via a sale to another PE-fund. The consequence of this is that a large number of transactions that were closed prior to the financial crisis that broke out in 2007 are still operating within an LBO framework, either now as a secondary LBO or still under the ownership of the first PE-firm. This means that banks will continue to be asked for financing of existing transactions either as recapitalisations, extensions or as secondary, tertiary buyouts. In Europe, funds focusing particularly on secondary buyouts are emerging, with one fund that was reported to have closed raising in excess of $7bn in volume (Prequin, 2012). Assuming an average equity contribution of 30%-40% shows the significant volume of transactions foreseen in this segment of the market.

Yet, even if an exit of the PE house is not required under the statutes of the funds, the debt included in these transactions is approaching its final maturity date and requires some form of refinancing. According to the Deutsche Bundesbank (2010), an amount of approximately €76[12]/$100bn of buyout loans (*author's comment: of which LBOs are a significant part*) will reach their final maturity in 2014 and a similar figure was shown for the year 2015.[13] Some comments have already been made that LBO structures are becoming more aggressive again. The IMF in its June 2011 Market Update of the Global Financial Stability Report stated that leverage multiples of leveraged loans were experiencing upward momentum again.

Banks can use the results of this study to critically review the work of their own credit functions. If any areas for improvement can be confirmed, the potential measures for more effectiveness can be considered as a starting point for further consideration. Moreover, the methodology could also be applied to review credit management processes for other specialised lending products. Finally, as the results remain exploratory and indicative, they offer many opportunities for further research to be carried out.

[11] See previous note.

[12] Converted at 1 $ = 0,76 € as of 31.12.2010.

[13] Volumes have been estimated from a graphical presentation included in the Financial Stability Report November 2010 (page 66 of the German Version of the Report).

1.3 Structure of LBOs

An LBO within this research is defined as a takeover of a company by a private-equity firm (PE-firm), where the majority of the purchase price is raised in the form of debt and where the underlying earnings (sometimes complemented by asset disposals) of the acquired business are meant to be the main repayment source (Deutsche Bundesbank, 2006). A review of educational literature (e.g. Arnold, 2008), the publications of other institutions (e.g. IMF, 2007b), or recognised dictionaries (e.g. Concise Oxford Dictionary, 2011), provides a high level of consistency within the definition.

In order to be able to service the significant debt involved, companies with high cash flow stability are typically considered suitable for LBOs (ECB; 2007a). An early study carried out by Lehn and Poulson (1989) on US public-to-private transactions found that available free cash flow increases the propensity of a company going private and can be regarded as early support for the statement regarding the requirement of high cash flow stability

PE-firms invest in LBOs through their funds which are mainly from institutional investors and high net-worth individuals. Their funds usually have a predetermined limited lifetime (Kaplan and Schoar, 2005/Kaplan and Strömberg, 2009; regarding limited lifetime also see Deutsche Bundesbank, 2007). The ECB (2007a, p. 8) describes PE as

"medium to long-term equity financing of unquoted companies or financing of the equity tranche of buyouts of public companies".

Profits are to be achieved by receiving a higher price when the business is resold and/or by accumulating and the taking out of cash from the business based on improved operating performance (see for example, Deutsche Bundesbank, 2007).

While this research focuses on the work of the credit function of banks and therefore the main concern is bank debt, some understanding of the overall structural aspects is required since there are interdependencies within the debt. Figure 1-1 provides a schematic overview of how LBOs were frequently structured.

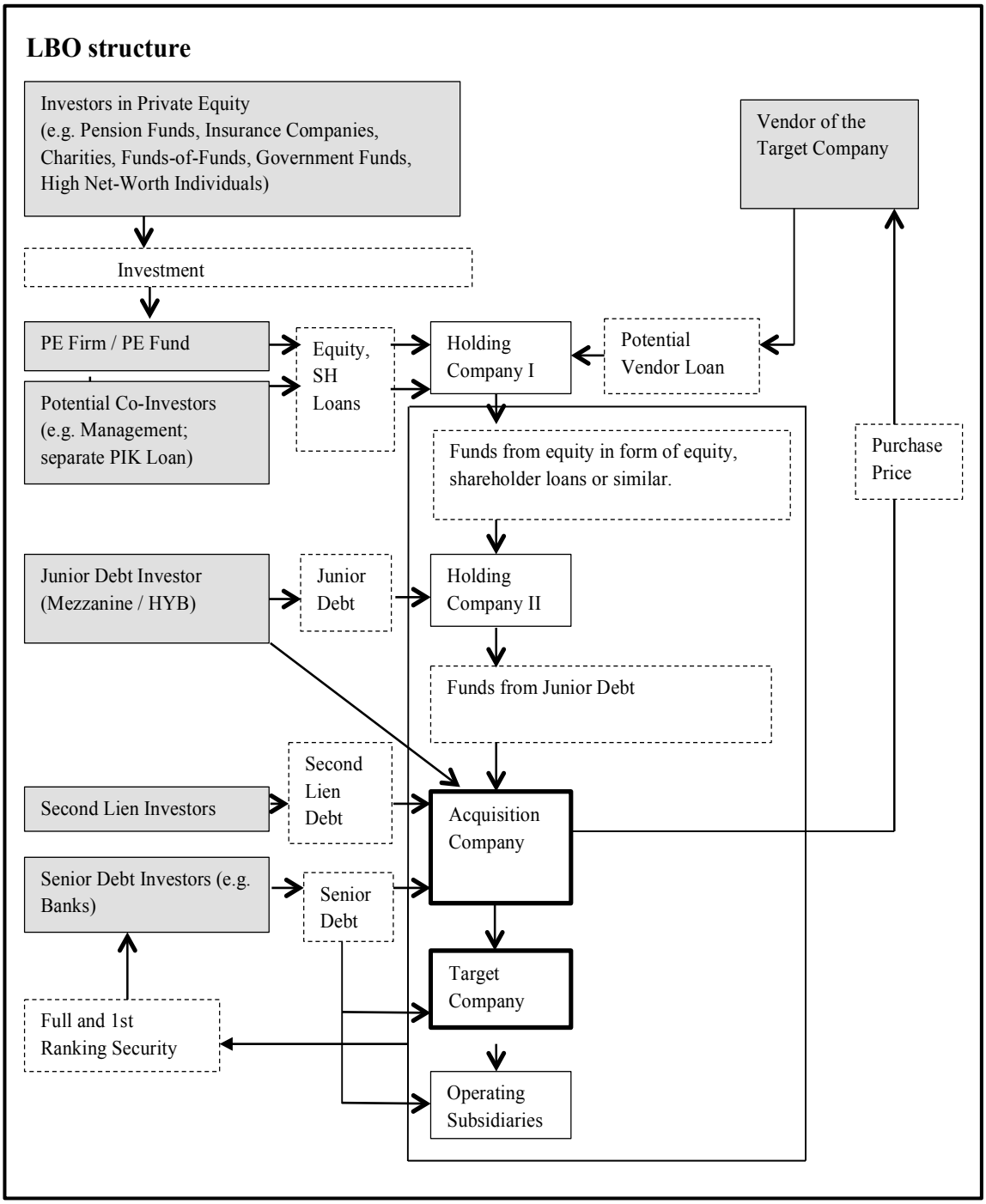

Figure 1-1: Structure of LBOs. Source: Author's own, adapted from Deutsche Bundesbank (2007) and Salans (2010).

Funds are provided at different levels within the structure and pushed down to the acquisition company, mainly via shareholder loans. The closer funds are to the target company, the more they benefit from seniority. A LBO credit within this research refers to a loan (or several loans) provided by banks in the form of senior debt to finance an LBO. While being exposed to higher credit risk compared to normal corporate credits,

within the LBO structure they benefit from a significant degree of seniority. They are largely granted to a company (acquisition company) that is close to the target company and sometimes to a smaller degree directly to the target company or even its operating subsidiary. Any revolving credit facilities are typically advanced at the level of the operating subsidiary.

In addition to benefitting from being close to the assets, they benefit from the security packages, which frequently go all the way up to the level just below Holding Company I. Second-lien investors are at the same level, but only have a second claim on security that is granted, whereas more remote lenders such as junior debt also face structural subordination. However, as indicated by the direct arrow from junior debt to the acquisition company, conversations with market practitioners have revealed that presently these lenders also succeed in becoming lenders to the acquisition company, removing the structural subordination, while contractual subordination is maintained. An even more recent development is that all the debt (senior and junior) is wrapped into one single tranche and the borrower pays a blended rate of interest, falling somewhere in between the senior and junior tranche. During the course of the empirical part of this research, market participants commented on this phenomenon, stating that this would largely be driven by the historically low recovery rates that were achieved for subordinated tranches.

1.4 The Role of the Credit Function

The credit function is defined as the organisational unit within banks that is charged with analysing and monitoring LBO credits. Figure 1-2 provides a schematic overview of how credit functions work and the overall focus of the thesis. Typically, credit functions receive requests from the structuring teams, which put together the initial credit application. Credit functions are then required to opine on these proposals and to approve them or to provide a recommendation for the relevant approval authority. The result can also be that some corrective action is proposed or demanded. When dealing with new transactions, this is referred to as credit analysis, whereas the on-going surveillance is referred to as credit monitoring.

The focus of the work of credit functions is the credit risk, which within this thesis comprises both the **default risk** and the **recovery risk**.

Default risk describes the risk of an LBO company not being able to meet its contractual payment obligations.

Recovery risk deals with the risk that the amount of debt outstanding that can be recouped once a default has occurred is low.

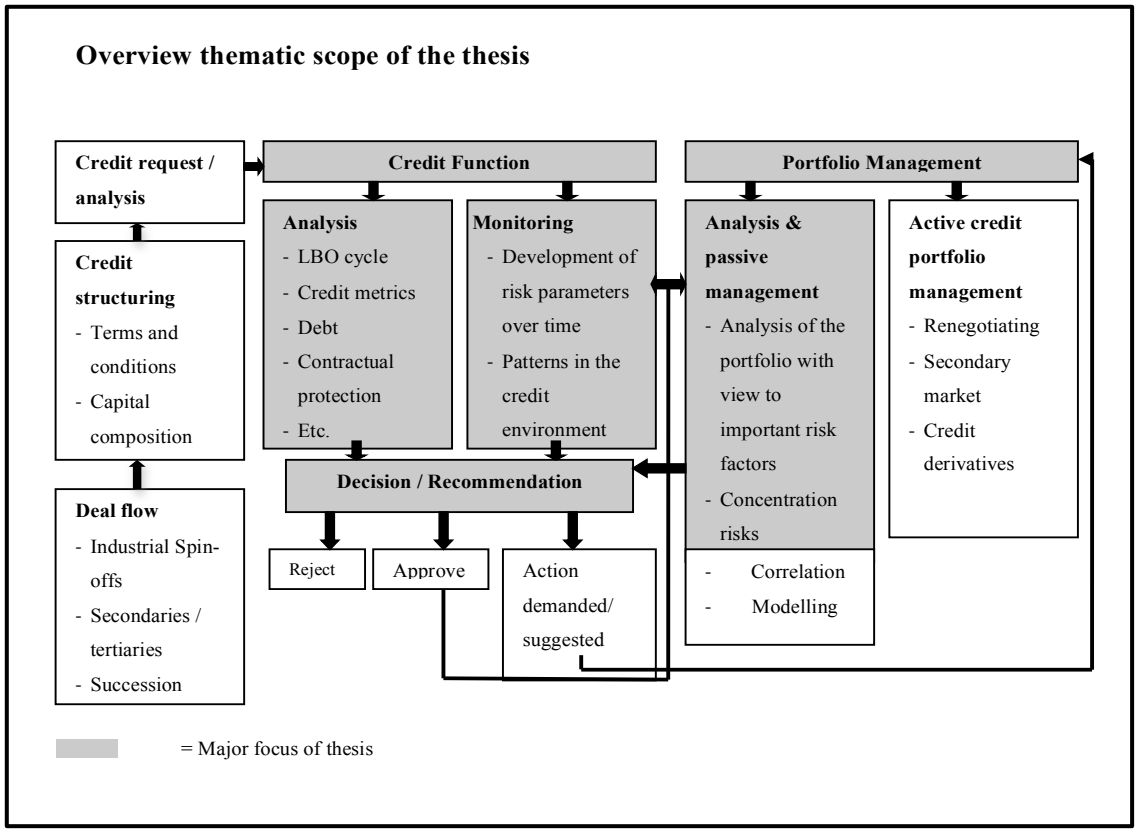

Figure 1-2: Overview thematic scope of this thesis. Source: Author's own.

Closely related to the work of credit functions and in part overlapping is credit portfolio management. No unique definition of credit portfolio management exists. However, owed to the principal business of banks, there has always been a need to manage credit exposures effectively by avoiding concentration risks and by early recognition of deteriorating credit exposures (e.g. Felsenheimer et al., 2006, p.13). From this, conclusions can be drawn regarding the potential impact of individual loans and the portfolio as a whole. Active credit portfolio management, as defined in this research, analyses the risks also with regards to their correlation and is based on this. Risks in credit portfolios can be adjusted by either using more traditional methods such as renegotiating with the borrower, or by taking advantage of more liquid secondary markets and the quantum of credit derivatives (similar, Felsenheimer et al., 2006).

Credit portfolio management has been high on banks' agendas in the last few years and continues to be so (Ridder, 2009), especially since the mid-1990s (Stegemann and Jamin, 2008). Amongst the drivers behind this are a more liquid secondary market, a challenging competitive environment and the serious effect loan losses can have on profitability in banks (Dürr, 2008). Yet, banks vary greatly as to how they organise and implement CPM within their processes, which ranges from banks with centralised credit portfolio management units that do take ownership of assets and are expected to generate profits at one extreme to those institutions where this largely rests within the risk-taking/risk analysis units (Ridder, 2009; Dürr, 2008; the authors also provide descriptions of the features of the individual models).

The surveillance of exposures based on some criteria has been at the centre of credit portfolio management from a historical perspective (Garside et al., 1999) and is actually more commonly associated with the work of credit functions. Part of the implications during the financial crisis has been that banks were unable to manage the exposures simply because there was no market to trade or transfer risks, at least not at a reasonable price. Therefore, much of what had previously been possible under active portfolio management was no longer available. As a result, more traditional measures have increased in importance again. The measures of credit portfolio management are referred to using aspects of portfolio-management (APFM), reflecting that the use is limited to what can be practically utilised in the work of credit functions.

One question that might arise at this juncture is why the research focuses on the credit function, and does not take a wider view, such as that of a central credit portfolio management function. First, credit portfolio management has not strongly focused on LBOs; therefore gaining transparency and understanding the risk factors and their use in the credit management process is a reasonable starting point. Acceptance for credit portfolio management is also likely to be higher if it starts at this early level. Secondly, the most advanced business model where CPM functions do take full ownership of the assets are typically formed as profit centres (Ridder, 2009; Dürr, 2008) and therefore cannot be allocated within credit functions for potential conflict-of-interest reasons. Thirdly, even if a bank chooses to implement a separate credit portfolio management function that actively manages the portfolio, this would not preclude credit functions to form their own view of the portfolio and to take this into account when evaluating

individual transactions. Therefore, the co-existence of several approaches, potentially with slightly different goals, is a possibility.

1.5 Structure of the Thesis

To achieve its research aim, the thesis first reviews the literature related to the risk factors in LBO credits. The thesis also introduces some basic aspects of portfolio management and highlights the results of a survey relating to LBO credit risk management practices. Here, the research finds an inconsistency: On the one hand, risk factors in LBOs are well known and allegedly credit risk management practices are very detailed and sound. However, on the other hand, if credit risk management was adequately focused on the relevant risk factors and sufficiently integrated, then the constant drift to more risk (i.e. higher debt multiples, loser covenants, more complexity in debt composition) until shortly before the financial crisis (2007) should not have occurred. This observation formed the basis for the empirical part of this study. Within this, the importance ascribed to individual risk factors and the utilization of these risk factors within the credit management process was analysed using a semi-structured questionnaire/interview instrument to gain information from the experts about the work of credit functions (See Appendix 2, p. 154). The analysis uses a combination of quantitative/statistical and qualitative methods. This was necessary for completeness and at the same time served as a built-in measure with the aim of enhancing reliability, validity and generalizability. As a further step in this direction, the aggregate results were discussed with four senior credit executives who were not previously involved in the study. Ultimately, the results were presented to the credit function of a bank and comments were invited.

From here on, the structure of the thesis is as follows:

- Chapter 2 (Literature Review and Research Problem Development, p. 16) focuses on the literature relating to risk factors in LBOs, both from a market as well as from a transaction specific perspective. The chapter also introduces some measures of credit portfolio management that could easily be used by credit functions. Regarding the actual practices of credit functions, the literature review takes advantage of the results of a survey, carried out by the BSC. The chapter

concludes with a summary of the findings and the identification of the research problem.

- Chapter 3 (Research Objective and Methodology, p. 52) operationalizes the research problem by transferring it into a wider research aim and a series of research objectives. It then discusses where the research is allocated within the research paradigms and describes the research design and details of the data collection process. This chapter also contains a section on research ethics.

- Chapter 4 (Data Analysis and Research Findings, p. 74) describes how the data was analysed and shows the results of the analysis. Results relating to individual aspects are discussed and then synthesised. The chapter also explains how the results were checked for plausibility to enhance their robustness.

- Chapter 5 (Conclusions, Limitations and Further Research, p. 121) uses the results from Chapter 4 to draw conclusions. It also contains a summary of the study, explains how it contributes to knowledge, states the limitations of the study and makes recommendations for further research.

1.6 Main Results of the Thesis

The study finds that there are clearly identifiable risk factors in LBO credit risk. Most importantly, leverage appears to be the dominant individual driver of credit risk. In total, ten risk drivers are identified which are important for default risk and recovery risk. These are the LBO cycle, sponsor quality, type of transaction, leverage, financial covenants, debt composition, jurisdiction, collateral, industry state and the overall state of the economy.

The research finds that credit functions are well aware of these risk factors. In particular, it is viewed that there are cyclical moves in LBO activity (LBO cycle) that do cause risk factors to change which can be used as a signal for more risk in the overall market. The factors mainly signalling this are leverage, the type of transaction, financial covenants as well as sponsor quality.

Interestingly, while the importance of the LBO cycle is acknowledged, as is the importance of the remaining risk factors, this does not consistently translate to high attention to these factors in credit analysis and credit monitoring. The LBO cycle and sponsor quality are factors that receive little attention in these areas. Also, generally, the use of the risk factors overall is less present in credit monitoring then in credit analysis.

The research also suggests that aspects of portfolio-management such as concentration measures or classification of the risk factors into categories are not used to a large extent at credit function level while this could improve the effectiveness of the credit management process.

The research then argues that the discrepancy between the importance of the risk factors and their use in credit analysis and credit monitoring as well as the limited use of portfolio-management with view to the risk factors represent areas of improvement. These have been defined as follows from this research:

- Inclusion of systematic risk as represented by the LBO cycle.
- Completeness of credit risk evaluation; ensuring that all the risk factors are viewed in accordance with their evidenced importance for the default and the recovery risk.
- Systematic integration of credit analysis, credit monitoring and credit portfolio management which is a pre-requisite for a to be accomplished.
- Utilization of results for credit decisions, as otherwise the above remains purely analytical without any practical relevance.

A short discussion on how these could be addressed conceptually is included as the final part of the research; but before any of these would be addressed and practical implementation would the considered triangulation of results and further validation would be required as the research had some limitations including limited sample size and timing lags (see Section 5.4, p. 132).

Chapter 2: Literature Review and Research Problem Development

2.1 LBOs and Similar Transactions

This section discusses some of the similarities and differences between LBOs and similar transactions, namely MBOs and LRCs. This was viewed necessary as later sections partly utilize research on these transactions and this literature review makes inferences for LBOs from this.

LBOs in general are a considerably researched subject and have received much attention from the academic community as well as from industry researchers or market experts alike. Sometimes research is focused on the related transaction category of Management Buy-Outs (MBOs) instead of LBOs and sometimes the term Highly Leveraged Transactions is found. This typically includes MBOs, LBOs as well as LRCs.

An LBO has been defined as a takeover of a company under the control of a PE-firm in the introductory section. Management typically receives some participation in these transactions. By comparison, MBOs typically describe the takeover of a company under the control of the management, while it is also not uncommon to find the term MBO without making it clear whether this includes the cases where PE-firms play a role (i.e. LBO) or not. Moreover, also in an MBO, there is typically significant debt financing involved. The definitions overlap. The Oxford Concise English Dictionary actually relates the term leveraged buyout (i.e. LBO) to the purchase of the company under the control of management (Oxford Concise English Dictionary, 2011).

An LRC, by contrast, is marked by existing shareholders taking distributions in the form of dividends or equity reimbursements (similar, Gupta and Rosenthal, 1991), which are frequently funded by a debt instrument. The border between these three types of transaction is not clear-cut, even leaving aside the definitions found. Many transactions would fit into more than one category, even if rigid definitions were used. For example, a significant number of LBOs actually paid out large debt-funded dividends to their PE-firms in the years 2005-2007. Utilizing research by Gupta and Rosenthal (1991) regarding the differences between LRC and LBOs, the similarities and differences between those transactions and an MBO can be summarised as shown in the following table.

Similarities and differences between MBOs, LBOs and LRCs			
Aspect	**MBO**	**LBO**	**LRC**
Significant increase in debt load and deterioration in debt protection metrics	Strong	Strong	Strong
Increased pressure on management to focus on cash-flow	Strong	Strong	Strong
Increase in Management Ownership/Employee Ownership	Strong	Medium	None*
Principal-Agent Relationship Mgt. and Shareholders	Little conflict, interests aligned	Reduced potential for conflict, due to management participation in equity	Unchanged
Default would hurt management's personal wealth	Strong	Strong	Not directly

*Table 2-1: Similarities and differences between MBOs, LBOs and LRCs. Source: Author's own; aspects utilised research by Gupta and Rosenthal (1991). * Gupta and Rosenthal view this point as strong also in LRCs. Gupta and Rosenthal do not comment on all these aspects.*

There are strong similarities and there are likely to be similarities in the determinants of default within those transactions, which is why this broadened focus of including research relating to MBOs and LRCs and making inferences is permissible. Where the character of the transaction is important for interpreting results, this will be taken into account.

Regarding the research on the general performance of LBOs (or MBOs/LRCs) and the drivers of default, much academic and industrial research is available and has been utilised. Industrial research is frequently much more focused on recent market developments or currently observed phenomena, although the methods used to derive conclusions are likely to be less technical. Its inclusion was deemed useful since it can

provide additional data points. Potential reservations are flagged accordingly in the relevant sections.

2.2 Performance of LBOs and Credit Implications

A natural starting point for a section dealing with LBOs is therefore the question of whether they tend to be successful transactions overall. From the viewpoint of the PE-firm, this would mean that they would actually be able to make a (significant) profit from these transactions. For banks providing the financing of these transactions the criteria of success would be less demanding, since from their perspective the avoidance of default is sufficient. As long as they are repaid and receive their interest payments in the contractually agreed manner, the transaction might be viewed a success, albeit from a broader conceptual perspective this is questionable, as will be discussed further below.

Even if this criterion of meeting contractual payment obligations is accepted for a moment, what needs to be taken into account is that in many cases this is contingent on certain assumptions about growth in cash-flows and profitability being met. Demiroglu (2008) was able to show that debt was sized with a view to forecast EBITDA-growth. This means that some increase in operating performance is required to avoid default or at least that there is limited headroom for adverse change.

If the performance of LBOs was not satisfactory overall, this would raise the fundamental question as to why banks would participate in such a business by providing debt and taking a disproportionate level of risk. Views on whether LBOs lead to improvements in operating performance vary (see below; e.g. Bergström (2007) or Harris et al. (2005) vs. Cohn, Mills and Towery (2013)). The studies quoted below are presented to shed some light on this issue.

A number of studies have provided support for the claim that LBOs generate value and at least provide increases in cash-flows, which is what banks are mostly concerned with. For example, Guo et al. (2011) evaluated the performance of 192 LBOs in the US, all of which took place between 1990 and 2006. For a subset of 94 companies with adequate data on the post buyout performance, they found significant returns between the buyout and the value after the outcome (IPO, trade-sale, secondary LBO, chapter 11, still private) driven by tax benefits, operating performance improvements and valuation

developments. Regarding operating performance, they highlight that the improvements they measure post buyout are less than those shown by studies using earlier data and are frequently only close to those of those of benchmark firms. Still, the contribution from operating performance to the increased valuation is substantial.

The holders of the equity, i.e. the PE-firm, would typically initiate governance changes (Halpern et al., 2008) since ultimately they are the principals and the managers represent their agents. Guo et al. (2011) found that the improvements are positively related to changes in the CEO.

Acharya et al. (2013, see below) have also researched whether there is an improvement in performance driven by the involvement of a PE-firm (sponsor), which they were able to confirm. I interpret their research to further support the positive performance of LBOs, provided an experienced PE-firm is present. It also suggests that the quality of the sponsor is an important aspect. The improvements in performance are mainly seen to stem from the exercising of close monitoring and control by the PE-firm (e.g. Gao, 2014, similarly Demiroglu 2008, Cotter and Peck 2001), the unification of interests between management and shareholders following the LBO and the disciplining effect of debt which forces management to focus on cash flow generation (see also e.g. Jensen 1986). However, Bergström et al. (2007) point out that according to Modigliani and Miller (1958) debt on its own cannot change the returns to the company's stakeholders. Therefore at first glance the argument of a positive effect of debt could be viewed inconsistent with the view established by Modigliani and Miller (1958). However, the proponents of LBOs usually do not attribute the value increase to the debt itself, but to the effects that debt has for management. Therefore, it could be possible that other incentives to focus on cash flows in the same manner as LBOs do would lead to similar results.

Industry research frequently outlines the superior performance of LBO transactions based on how they actually improve profitability. An interesting practitioner's point of view was presented by Ernst & Young (2007) which showed that average improvements EBITDA for PE-led firms was 16%, compared to 10% for publicly traded companies.

While such studies according to the practitioner's view have their value and provide first indications, some further aspects ought to be considered before conclusions are drawn. A first point is that value enhancements might be the result of improvements in profitability and productivity, but could also result from general positive market sentiment or overall industry effects.

Some studies have taken account of industry-effects, such as Guo et al. (2011). Typically, these studies compare the performance of LBOs vs. the public companies within the industry or by allocating any surplus generated to components (such as industry performance or productivity improvements). Studies focusing on a number of operating financing measures and relating them to industry-performance in some form are preferable over simple profitability comparisons. Bergström et al. (2007) conducted such a study on a number of LBOs in the Swedish market. Their selection of measures - EBITDA-Margin, Return on Capital and Sales Growth can be interpreted as measures for profitability (EBITDA-Margin), productivity (Return on Capital) and growth potential (Sales growth). They found that LBOs outperformed their peer-group on the first two measures (both in absolute and industry adjusted measures).

A much earlier study than that undertaken by Bergström et al. (2007) was performed by Kaplan (1989), who investigated a total of 48 buyouts (public to private transactions in the US) with a view to whether they produce significant improvements in operating performance. Overall, the analysis was supportive of improvements in earnings and cash flows, albeit the former only show a remarkable upward move in the third year following the buyout. Also, earnings ratios to sales and to assets (the latter to take into account changes in the asset base) show improvements. Importantly, positive changes were recorded also when adjusting for industry changes.

A common issue when using financial ratios for measurement purposes is that they are subject to various influences. While controlling for industry-effects is useful, it is not possible to take all potential external effects into account (for example the beneficial effects of currency moves) or those at the management's discretion (e.g. valuation assumptions which affect asset-based ratios).

A way to avoid this is to look directly at the productivity within the value chain of business. Harris et al. (2005) tested the performance of operating plants in the UK that

were part of a management buyout in the period from 1994 to 1998, covering 979 MBOs and almost five thousand plants. They concluded that productivity improves as a result of a buyout, in particular labour efficiency and total factor productivity. However, as sources they identified action driven by the management and cuts in the labour force. In contrast, Bergström et al. (2007) did not find support for significant labour force reductions. Smith (1990) who analysed 58 UK LBOs that took place between 1986 and 1997 also did not find significant reductions in employment levels, albeit cash flows were significantly improved.

Similar to Harris et al. (2005), Liechtenberg and Siegel (1990) analysed the effect of buyouts (LBOs including MBOs) on total factor productivity. Their database included 12.000 plants for buyouts that took place between 1981 and 1986. They were able to show that buyouts that occurred from 1983 onwards have shown significant productivity gains.

While the studies referenced above tend to support the improvements in performance in LBOs, the view is not unchallenged. Ayash (2013) conducted a study based on US LBOs. The analysis did not reveal any significant difference in the changes in profitability following an LBO when compared to their industry peers. Operating profit in relation to assets was higher in the first four years following the buyout, but then showed a remarkable reduction in the fifth year. However, Ayash demonstrated that working capital management significantly improves following an LBO and that LBO firms reduce investments and show lower growth in assets, employment and even in sales. The findings of Ayash could be interpreted that firms post LBO are managed with more focus on cash flow generation. Potential causes for this could be the requirement to operate under a higher debt burden (Jenssen, 1986) or additional expertise brought into a transaction by an experienced PE house (e.g. Acharya 2013).

As Ayash has, Cohn, Mills and Towery (2014) have also used data from US corporate tax return to investigate potential changes in the performance of LBO. Their sample size consists of 317 LBOs that occurred between 2005 and 2007; all the companies in their sample were public companies prior to the LBO. As measures they use pre-interest return on assets and on sales as well as a measure of economic value and cannot find significant improvements in these measures post LBO for the entire sample. In contrast, when they focussed the analysis solely on those LBOs that continued to publish

financial statements, they discovered some improvements on performance, in particular based on industry-adjusted measures. Their observation regarding asset growth and sales growth does not provide a clear trend towards reductions, as was the case for Ayash (2013).

Liu (2013) did an examination of 501 US LBOs that were public to private transactions during the years 1986 to 2011. Interestingly, he finds improved performance of transactions that were concluded in up to the 1990s. However, for transactions post 2000 no significant improvement has been detected. This observation can be reflected upon against the increasing aggressiveness of transactions post 2000 and the rise in secondary and tertiary transactions.

Cohn and Towery (2013) performed a study based on US tax returns for a total sample of 408 LBOs that were private prior to the LBO between 1995 and 2007. In this study, the author's find some improvements in operating performance compared to the year prior to the buyout. However, contrary to Cohn, Mills and Towery (2014) they find very significant increases in sales within this group of LBOs and point out that these firms already have relatively high leverage when being acquired. The authors measured this by dividing the debt by the assets and show that the companies in this sample have this ratio at 59.6% prior to the buyout and 70.8% thereafter which compares to 36.6% and 74.8% for firms that are private prior to the buyout. It is argued that private companies' growth could be inhibited by a lack of funding options and that the involvement of PE removes this constraining factor.

Credit implications result based on whether LBO transactions actually do lead to performance improvements. If that is the case, then business plans showing growth in EBITDA can still be considered acceptable from a credit risk standpoint whereas if on the whole LBOs do not lead to operating improvements, this would suggest that the credit risk deteriorates based on the leverage and this is not mitigated by other improvements; hence they would simply be transactions with higher default risk. For recovery risk, this would mean that there is no improvement in the Economic Value and therefore during the lifetime of the transaction, improvements in equity cushions could not be expected.

2.3 Risk Drivers in LBOs

The previous section has established that LBOs are generally suitable for debt financing, but also highlighted that the risk-reward profile for banks providing these funds is likely to be skewed heavily to the risk side. Therefore, credit functions managing these exposures must review the credit risk in detail. The credit risk comprises the default risk and the recovery risk. Factors driving one or both of these components of credit risk are referred to as risk factors.

This section deals with these risk factors. Recovery risk is much less researched generally. Many studies on recovery rates use data from banks (e.g. Grunert and Weber, 2008) or rating agencies (Khieu and Mullineaux, 2009). While there is sufficient research on recovery rates in general, it is typically not tailored specifically to LBOs. Inferences from the general literature on recoveries needed to be made for this reason.

Linking the two areas together and making inferences, all the factors that are evaluated for default risk are also interpreted in terms of their relevance for recovery risk.

The identified risk factors that will be discussed in more detail below are:

- Sponsor Quality
- Type of Transaction
- Leverage
- Financial Covenants
- Debt Composition
- Jurisdiction
- Collateral
- Industry State
- Overall State of the Economy
- LBO Cycle

The LBO cycle as an overarching risk factor that is marked by changes in the individual risk factors and therefore discussed last within this section.

The factors jurisdiction, collateral, industry state and overall state of the economy are only considered in terms of recovery risk. In developed countries the legal system as reflected in the factor jurisdiction comes into play when a default has occurred or is likely in the near future. This is the same for collateral. It should not be assumed that jurisdiction and collateral have an influence on the risk of default.

The risk factors industry state and overall state of the economy also influence the default risk. Yet, this feature is likely to be present for all borrowers, not simply for LBOs. However, as LBOs show an above propensity to financial distress based on their highly leveraged capital structure, the issue of the impact on recovery is more important and this is likely to be different for LBOs than for other corporate borrowers (as will be discussed below).

The factors investigated for recovery risk overlap in part with those proposed by Böttger et al. (2008). In their working paper, they recommended a total of six factors for the inclusion in recovery estimation models, which is a focus different from the one of this thesis. Yet, all of the factors that are being discussed with view only to recovery risk are amongst their proposal, as is debt composition (which they relate to capital structure and seniority). As they are focused solely on finding input variables to recovery models, they do not discuss any of their factors with view to default risk.

2.3.1 Sponsor Quality

The influence of sponsor quality on the credit risk for an LBO can be summarised by two factors. The first relates to the control that a PE-firm exercises. Due to their high return requirements, they narrowly follow their transactions and where necessary make changes to management and/or board composition. In broad terms the implications for this study would be that:

- If sponsor quality influences the performance of the business, it serves to lower the default risk.
- If sponsor quality enhances the operating performance, enterprise value increases and has an impact on the recovery risk.

- Recovery risk could also be impacted if high quality sponsors do actually help resolve financially distressed situations.

Generally, financial sponsors enable companies to take on more debt, whether this is simply because of their knowledge about funding options available or because lenders take comfort from their involvement. Gao (2014) analysed whether there is value-creation in LBOs from the influence of the financial sponsor and from debt. While he did not find a contribution from debt, Gao found substantial contribution derived from the influence of PE firms in LBOs. Liu (2013), in contrast, uses various measures for PE reputation but finds no significant relationship with performance but finds that LBOs with a high reputation sponsor are more likely to be exited successfully, which also is important for bank credit risk.

Cohn and Towery (2013) show that private companies subject to an LBO were already operating under high leverage which increased further following an LBO and that sales increased substantially thereafter. This at least indicates that lenders attribute some value to the involvement of PE firms.

Also, high reputation sponsors appear to be more selective than those with less positive reputations. Cao, Mason and Song (2010) have analysed how sponsors have acted during the years prior to the financial crisis, when credit was easily obtained. They found that high reputation sponsors had focused more on better quality companies (authors comment: lower default risk companies) and actually chose transactions that had more covenants. Both of which indicate that they are influential on the risk of default.

As part of his analysis on the impact of sponsor reputation on the financing structure, loan contract terms and valuations, Demiroglu (2008) demonstrated that LBOs with the involvement of a high reputation sponsor would show fewer cases of financial distress. Consistent with this, Acharya et al. (2013) found that mature PE-firms in particular are able to generate superior returns, which is attributed to their active engagement and specific skills in the transactions, which influences operating performance. This is also in line with Brinkhuis and De Maeseneire (2012), who demonstrated that high

reputation sponsors do receive higher leverage. If this is the case, the bankers providing this leverage obviously view the reputation of the sponsor as a factor that mitigates risk.

Cotter and Peck (2001) performed a similar analysis. They tested whether companies benefitted if a buyout specialist holds a controlling stake. They found that transactions that benefited from a buyout specialist (*author's comment: typically a PE investor who is able to exercise close monitoring of performance and if required takes corrective action*) were less likely to encounter financial distress. Interestingly, this was the case, albeit the credit terms imposed on them were frequently less demanding, which would normally be expected to increase the risk of default. On the other hand, they found that the transactions that were not controlled by specialised PE-firms (for example, classical MBOs) experienced improvements in their operating performance if debt terms were tight, which suggests that the argument that pressure caused by debt increases performance is particularly important for this category of buyouts. Put differently, this means that covenants (or constraining debt terms) are a useful instrument to enhance performance and reduce default risk (see below), but experienced PE-firms that get actively involved are a more important driver and therefore they do overcompensate the shortcomings that the capital structure or debt documentation might have from a banker's point of view.

Denis (1994) provided a case-study which compared the performance of Kroger's recapitalisation and Safeway's LBO. The comparison was suitable as both businesses were active in grocery stores. Denis explains the different approaches to restructuring, which in the case of Safeway are more focused on aligning interest between principals and agents (such as performance oriented compensations and increased monitoring) whereas Safeway focused on finding liquidity in the company by selling assets or cutting capital expenditure. In his analysis Denis shows that returns to investors and improvements in operating performance were higher in the case of the LBO.

The argument that specialised PE-firms would also protect the interest of debt investors was also tested by Opler (1993). Opler found that the presence of a specialist LBO focused PE-firm also reduces the interest payable, which is supportive of the claim. The argument was recently substantiated by a study on yield-spreads of companies that had

private equity involvement performed by Huang, Ritter and Zhang, 2013. The authors conclude *"...reputational concerns alleviate their (author's insertion: PE firms) incentive to expropriate the bondholders of their portfolio companies",* (Huang, Ritter and Zahng, 2013, p. 31).

The important role of a PE investor, as outlined in those studies, can be reflected upon against a recent piece of collaborative research between Boston Consulting Group and IESE Business School (IESE, 2008). Their study points out that increasingly those PE-firms that generate superior returns also get involved in the fundamentals of the business.

While Cohn, Mills and Towery (2014) do not find support for operating improvements from operational involvement of the PE firm (nor from other explanations), they provide some data that shows that financial sponsors make notable contributions to LBO-companies even post LBO to help their portfolio companies when needed. The total post LBO contribution they report is 8.55% and 2.66% during year one and two after the buyout. The commitment of the PE firm to their portfolio companies is further supported by Cohn, Mills and Towery's observation that dividend distributions to PE houses are generally relatively limited. Therefore, sponsor quality needs to include the willingness and ability of the sponsor to commit additional funds or not to take out dividends.

There are measurement issues involved in sponsor quality. It is first usually surrogated by the sponsor's reputation, which is measured by some sort of market share criteria. However, in summary the existing research supports that the quality of a sponsor has an influence on the default risk and the recovery risk of LBO transactions, since there seems to be evidence of them enhancing performance. If the line of argument put forward by Opler (1993) is valid, this would suggest that this also has an impact on recovery rates. PE-firms would step in if financial problems arose and potentially provide additional funds to rescue the business.

Hotchkiss et al. (2012) have analysed how PE firms handle financial distress and found that PE backed firms exit the crisis state more quickly and re-emerge as on-going

businesses more frequently than their non-PE peers. Once controlling for industry and company specific aspects, they also found that there are no differences in recovery rates. This suggests that PE firms are dealing with such situations very rationally with a focus on minimising the cost of the crisis.

2.3.2 Type of Transaction

The reasoning why the type of transaction could have an impact on the credit risk in LBOs can be summarised as follows:

- It is assumed that much of the upside potential has been lifted during the primary buyout, therefore there is less left for the secondary buyout.
- In order for the first-time buyer to achieve an adequate return, the purchase price of a secondary buyout needs to be higher than that paid in the first time transaction, which leads at least to higher debt levels in absolute terms.
- If both of the above are correct, then this would suggest a lower recovery rate since there would be more debt sharing in the value of collateral or the enterprise value.

Wang (2012) analysed the rationale for secondary buyouts. One of the potential rationales he put forward were efficiency gains, as is a rationale for LBOs in general. While absolute cash-flow levels (as well as EBITDA) rise following a secondary buyout these are accompanied by lower efficiency as measured by EBITDA/sales or in relation to assets. Testing further potential explanations regarding the rationale, the author concludes that the best arguments are in favour of private equity firms using the opportunity of favourable debt market conditions while the equity markets are inactive as an exit route. Bonini (2012) found marginal to no improvements in operating performance in secondary buyouts, while at the same time showed that they retain less liquidity and have higher debt levels compared to primary transactions. Bonini (2012) also points out that the source of return for the investor is a different one. In primary transactions, this is mainly generated through the exit price, whereas in secondary transactions this is based on distributions during the life of the investments. This

increases the vulnerability of these transactions to adverse changes in their operating environment compared to primary deals (Bonini 2012).

Sousa and Jenkinson (2010) find that secondary LBOs have weaker operating performance than those transactions where the exit from the PE-firm was achieved via an IPO. They also show a decrease in return on assets, which they state is indicative of the company operating less efficient. This is consistent with Wang (2012). However, on operating cash flows the improvements are stronger for secondary transactions, which is attributed to reductions in capital expenditure.

Axelson et al. (2013, 2010) found that secondary LBOs have more leverage. Brinkhuis and De Maeseneire (2012) tested whether there are differences in leverage measures between primary and secondary buyouts. Their hypothesis is that primary transactions have more leverage. Consequently, a greater amount of debt can be borrowed against future improvements projected in a primary LBO. They found that secondary buyouts are significantly more leveraged than primary transactions. This is consistent with the view that practitioners take. Now, as leverage is an important driver of defaults, then by implication secondary buyouts exhibit higher credit risk. At least a further indication for more risk in secondary (or tertiary transactions) can be obtained from the research undertaken by Guo et al. (2011, 2009). In their analysis of the returns on LBO transactions (measured as any cash flows received during the holding period and the terminal value, divided by the purchase price when the transaction took place in the case of post buyout returns), they found that in particular in transactions where the exit is established via a secondary LBO a large part of the gain in capital can be attributed to changes in operating performance. The part of the return that can be attributed to operating performance is larger in secondary LBO exits than for exits established via trade sale or IPO. This provides support for the assumption that in secondary transaction, additional improvements in operating performance are more difficult to achieve as a larger part might already have been achieved (which the first-time buyer realizes when the secondary buyout takes place). However, the evidence regarding secondary LBOs is not conclusive yet and research into this area is just emerging. Bergström et al. (2007) did test whether secondary LBOs have less operating improvements than primary transactions. While their regression results shows the

expected sign for this, the relationship is not significant and therefore cannot be confirmed.

2.3.3 Leverage

The impact of leverage on default risk and recovery risk is rarely disputed. Given that there is support for the fact that LBOs increase value, they are also accompanied with increased credit risk. This is consistent with the basic principle of corporate finance that return is a function of risk. If LBOs outperform their peer-group, then it comes as no surprise that they show more risk. Funding a company with debt creates a contractually enforceable payment obligation, usually in the form of on-going interest requirements and in terms of repayment instalments. In the previous section it was summarised that the debt incurred in these transactions is one of the drivers of value increase. Conceptually, increasing debt reduces the cash available at the management's discretion and by creating a fixed payment obligation leads to more efficient management (Jensen, 1986). The use of debt is one of the suspected value drivers in LBOs. However, its actual contribution is controversial. For example, Gao (2014) was not able to show that debt positively contributes to value enhancement. In contrast, Lie (2013) did find that improved performance was associated with higher leverage (amongst others).

Generally, the higher the level of debt, the higher these obligations and the more likely they might be missed. In the case of the default of the borrower, debt providers are likely to lose a significant part of the principal amount that they have advanced, while in the case of orderly performance their upside is limited to contractually agreed interest payments. In this regard, Hotchkiss et al. (2012) recently made an important observation. Their results can be interpreted as such that leverage on its own is a driver of default risk, but not the inclusion in an LBO as such since they found that there is no difference in the rate of default of PE owned firms and similarly leveraged non-PE firms. However, Hotchkiss et al. (2012) show that PE owned firms as such show higher rates of default than other leveraged borrowers, but are unable to confirm this once variances in leverage measures are taken into account.

Guo et al. (2011, 2009) outline that during the last upswing and high in LBO activity transactions were not structured as aggressively in terms of debt levels as the transactions that appeared during the 1980s, but they would still carry a high default risk (debt representing approx. 70% of total capital). Also, Guo et al. point to increasingly aggressive structures for transactions completed post 2005.

High debt loads are also stated to be a main risk factor by expert institutions, such as central banks or regulators. The Bank of England in its report dated July 2006 stated that leverage multiples have gone up substantially and that purchase multiples have reached record high levels. In the same year the FSA stated that lending to private equity backed firms "*may not, in some circumstances, be entirely prudent*" and that some defaults appeared likely (FSA, 2006, p. 7). The Deutsche Bundesbank in 2006 stated that the leverage ratios that have been reached would likely result in some insolvencies and declared the sharp rise in the ratio as a warning sign. A much earlier study by Smith (1990) also stated that too high leverage levels in LBOs may even cause companies with progressing operating performance to face difficulties.

Andrade and Kaplan (1999) used a sample of 31 transactions that took place between 1980 and 1989 and subsequently became financially distressed. They analysed them in terms of the causes of the financial problems experienced. They used three criteria as qualifying for financial stress: Insufficient EBITDA to cover interest expenses, debt restructuring requests or a default. For the sample companies, the authors investigated whether and if so, to what extent, the default (measured as the quantum of cash insufficiency) is caused by industry performance, firm specific performance, changes in interest rates and debt levels. They found that firm performance actually somewhat reduces the effect on the shortfall in cash, since the firms in the LBO sample performed better than their industry peer-group on average. This is consistent with the conclusion drawn previously that LBOs do lead to performance improvements. In terms of default risk, the clearly dominant contributor to a cash shortfall within the Andrade and Kaplan study is leverage.

Prior to Andrade and Kaplan, Asquith et al. (1994) utilised the same type of test and applied it to 102 US companies that went into financial distress after issuing a high-

yield bond. Their financial distress criterion was defined as a company generating insufficient EBITDA to cover interest expenses for two consecutive years. They come to a different result, with firm specific factors showing the strongest contribution to cash shortfall. This is likely to stem from the companies in the Asquith et al. sample having had some financial difficulties already when the high-yield bonds were issued. This can be deduced since Asquith et al. (1994) described that their sample firms were normally negative at the level of the EBITDA in the year of issuance and performance (EBITDA/assets) was below the industry-median. Both were not the case for the companies in the Andrade and Kaplan sample. In Andrade and Kaplan, companies were EBITDA positive and outperformed their industry peer group (albeit they were distressed). Although firm specific factors played by far the most important role in the study by Asquith et al. (1994), leverage still contributed 21% to the cash shortfall.

Khieu and Mullineaux (2009) found that the leverage (as a borrower characteristic) a firm has before it defaults actually impairs recovery rates.

The debt quantum in relation to cash-flow or earnings is even more important as this must be able to sustain swings in earnings and cash-flow generation throughout the time horizon since excess cash-flow is not typically used to reduce debt. Cohn, Mills and Towery (2014) are able to show that LBOs do not reduce leverage significantly in the years following the buyout and argue that it appears to reflect an intended and long-lasting capital structure.

2.3.4 Financial Covenants

Financial covenants are components of the loan contract. They come into play in two forms. The most frequent form is that of a maintenance covenant, whereby the borrower needs to maintain certain minimum and/or maximum financial ratios. Typically, there are four maintenance covenants present in LBOs:

- Debt restriction (expressed as a multiple of a profitability/cash flow measure).
- Interest coverage ratio (requiring a measure covering interest expenses to be at least x-times the interest expenses).

- Cash flow coverage ratio (requiring that operating cash flow covers the cash-debt service at least x times).
- A cap on the annual amount allocated to capital expenditure.

Alternatively, so-called incurrence covenants only prohibit the borrower from taking on additional debt beyond a certain level.

A violation of a financial covenant constitutes an event of default, which entitles the lenders to call the loan (Deutsche Bundesbank, 2007). The arguments put forward for the impact of covenants on credit risk can be summarised as follows:

a) They provide a tool for the close monitoring of transactions and early recognition of adverse developments.
b) They convey a strong lever for negotiations, since they provide lenders with control in the case of violation.

Some research into this area exists and is largely supportive of the impact of financial covenants on the credit risk. Demiroglu (2008) found that financial covenants reduced the default risk. Liu (2013) was able to show that tighter financial covenants are related to improvements in operating performance. Covenants are considered to be important tools in monitoring transactions by market participants (Deutsche Bundesbank, 2007). Acharya et al. (2007) argued that due to the covenant-lite structures towards the end of the last LBO cycle, recoveries would likely to be lower. Khieu and Mullineaux (2009) stated that due to covenants being included in structured loans, recoveries are higher. Carey and Gordy (2007) investigated recovery rates for firms in bankruptcy in the US. On average, they found a sample mean of 50% for firm-level recovery, with bank debt achieving significantly higher recoveries at 79%. Most interesting for the purpose of this document is that they were able to demonstrate statistically that the share of bank debt very strongly increases recovery rates and dominates other factors. Accordingly, they view bank covenants to establish relevant rights (consistent with what has been stated above) that support recovery rates.

2.3.5 Debt Composition

Debt composition refers to the point that LBOs typically contain several layers of debt (e.g. Axelson et al., 2013; Deutsche Bundesbank, 2007; see also Figure 1-1, p. 9). The reason why these are considered to impact on credit risk in LBOs is that a diverse lender-group is expected to show diverging interests and can make negotiations regarding amendments or restructuring more difficult (see also Halpern et al., 2008). This may actually be necessary before an actual (payment) default has taken place, therefore impacting the default risk. Post default, this could lead to difficulties in negotiating the restructuring consensually, causing an inefficient process and the dilution of recovery rates.

Halpern et al. (2008) studied the effects resulting from changes in governance vs. those in the financing structures on the default risk of HLTs. For this purpose, they analysed a sample of 72 HLTs, of which half related to leveraged recapitalisations and half to LBOs, all of which took place between January 1985 and January 1990. They tested the hypotheses that companies were less likely to encounter financial distress or bankruptcy if they changed their governance or alternatively used less public debt and more private debt. Whereas the bankruptcy criterion had simply been defined as the actual filing, they used the term financial distress when a company failed to satisfy one or more of its financial covenants. They found that the post transaction debt loads between LBOs and LRCs are not significantly different and therefore any difference in the occurrence of bankruptcy is likely to stem from other reasons. Moreover, they discovered that in LBOs changes to their governance parameters (shareholdings of management, CEO and board-changes) are quite common, in particular when PE-firms were involved. However, they did not find a significant relationship between governance changes and the presence of financial distress. In contrast, they found that financial distress is related to the inclusion of debt that cannot easily be restructured. Their assumption is that debt is more difficult to renegotiate if it is publicly traded, as this will mean a dispersed lender-base. The Deutsche Bundesbank (2006) reported results from a survey that banks thought differences in investment horizons and the ranking of different classes of lenders could be the source of difficulties in terms of restructuring transactions. This mirrors what the academic literature says from an expert's point of view.

Structures that contain a significant part of bullet repayments and no on-going interest payment requirements (Pay-In-Kind) where interest is added to the repayment amount have become common in recent years (Deutsche Bundesbank, 2006). However, at some point this obligation has to be met. These structures reduce the immediate pressure on the business, but create a high refinancing-risk towards the end of a transaction. Also, it has been argued that shorter maturities/higher repayment obligations help management focus on cash-generation (Demiroglu, 2008), which would be consistent with the arguments put forward by Jensen (1986). By implication, that would mean that longer maturities would have a contrarian effect. There would be less need to focus on cash-generation and less discipline would be required from the management. This naturally increases the risk of an LBO, since less cash accumulation means lower headroom to meet interest and principal repayments as well as potential prepayments in times of adverse business conditions.

Regarding recovery rates, a permissible conclusion is that if the total transaction value is higher, then there is most likely a higher level of absolute debt. This can be inferred since debt correlates with purchase prices (as documented by Axelson et al., 2013). In a scenario of financial distress this means the quote to be received is likely to be lower which adversely impacts recovery rates.

Bos et al. (2002) see seniority, debt composition and the debt cushion as important contributors to recovery rates. They define the debt cushion as the percentage of debt that ranks below the level of a specific instrument.

Taken together, it can be inferred that the debt structure has an impact on the default risk as well as the recovery risk in such transactions.

2.3.6 Jurisdiction

Jurisdiction refers to the question of which country's legal system is mainly applicable should a situation of financial distress occur. This is an aspect that comes into play when a default has occurred or is imminent. The legal system applicable has an impact on the options available for restructuring, as different jurisdictions offer different routes to resolve crisis situations. Also, the way in which rights and security may be enforced

differs substantially between countries (Westbrook et al., 2010). This naturally applies to all corporates, but for LBOs the aspect is particularly relevant because a situation of financial distress is more likely to occur and the transactions are heavily collateralised, normally including a share-pledge of the target company and all the companies in the structure that contain debt in whatever form, including mezzanine debt (e.g. Salans, 2010).

Franks et al. (2004) investigated a total sample of 2,280 small-to-medium sized firms that had defaulted, using data from ten banks. These banks were located in Germany, France and the UK. One of the key findings is that there were substantial jurisdictional differences in recoveries, with the UK achieving 75% recovery on average, Germany 61.4% and France just 52.9%. A further interesting observation is that they find higher recoveries for informal workout procedures compared to the cases where companies actually file for bankruptcy. This difference is small for the UK, but very large for France (mean workout 81.9% vs. 45.7% in formal bankruptcy). In this regard, an interesting comment the authors make is that some UK banks have specialised departments that come into play based on *a predicted default* and that there are substantial intra-country differences between banks. This suggests that banks can actively manage their recovery prospects and highlights the need for sensitivity in the mind-set of credit analysts regarding the emergence of financial distress and its consequences for recovery risk. Inferences can also be made to the importance of financial covenants as they are important monitoring tools and could trigger transfer of a credit to a specialised department.

As part of the study performed by Grunert and Weber (2008; see below), they also provide an overview of prior studies on recovery rates, differentiated by country. This overview also indicates that there are differences between jurisdictions.

The explanation behind the differences in recovery rates is assumed to be in the creditor friendliness of the system. This is assumed very high for the UK for example. Cao et al. (2010) use an index in their analysis of creditor rights and their influence on LBOs. Their results suggest that LBOs in countries that exhibit strong creditor rights show lower acquisition premiums (amount offered over the stock price prior to the LBO). This observation they refer to LBO sponsors being less able to extract value from the target. Both, lower premiums (i.e. more conservative purchase prices compared to

current market value) and less ability to extract value can be assumed to lead to better recovery once default occurs. This interpretation is consistent with the findings of Franks et al. (2004).

2.3.7 Collateral

An important study by Grunert and Weber (2008) focused on the recovery rates of commercial lending in Germany. They used bank data on 120 companies that defaulted between 1992 and 2003. They found that collateral is among the most important factors influencing recoveries. Khieu and Mullineaux (2009) also found collateral to be one of the most important drivers.

Franks et al. (2004) also found that collateral is an important driver of recovery. Interestingly, the impact of collateral appears to be higher in those countries that generally tend to have lower recoveries, since the most important influence was observed in France.

An earlier study by Gupton et al. (2000) focused on 181 US loans that had a liquid pricing at the time when the default occurred. The results were consistent with those of Franks et al. (2004) and with the remaining studies regarding collateral. They also identified collateral as a substantial driver of recovery rates and that it limited the influence of the industry sector. Some caution is required so, as Gupton et al. use the price of the loan one month post the default and not the actual recovery, which might not be a good predictor (Acharya et al.; 2007).

2.3.8 Industry State

Acharya et al. (2007) researched whether the defaults of firms in industries that can be regarded as distressed achieve lower recovery rates, using data on defaulted firms in the US from 1982 to 1999. They were able to confirm this, which is partly attributable to the limited ability of peer-firms in the industry to buy such assets. They argue that this relationship is largely influenced by high asset specificity, debt-levels employed in the industry and a limited number of firms within an industry. The implication for the credit management process is that analysts need to think of the industry in wider terms and form a view on whether there would be sufficient buyers for the assets of a company

and about the industry structure as a whole. As far as the general relevance of a sector for recovery rates is concerned, they found they were highest for the utilities sector. However, the recovery rates measured between other sectors were not statistically different from each other. This is consistent with Franks et al. (2004) who argued that the sector of the borrower (in their sample; see above) is by far less relevant than other factors (predominantly collateral). Khieu and Mullineaux (2009) also found a negative impact of industry distress on recoveries, but also found differences in recovery rates between sectors.

Industry state appears to play a role for recovery risk, although in very specific circumstances. The most important aspect here appears to be whether there would be interested competitors to buy the assets of the defaulted company.

2.3.9 Overall State of the Economy

Bos et al. (2002) flagged that average recovery was remarkably lower during a sub-period with rising defaults (1998-2001) when compared to their entire horizon of investigation (1988-2001). This can be interpreted as recoveries being lower during recessionary times and also being lower for industries in financial distress, since both would be observed during rising default rates.

Khieu and Mullineaux (2009), contrary to some other studies (e.g. Grunert and Weber; see below), found that solid macroeconomic conditions enhance recoveries, whereas industry distress has the opposite effect. They also found significant differences between sectors.

In contrast, Grunert and Weber (2008) did not find support for the assumption that macroeconomic conditions are an important aspect of recovery rates; neither did Acharya et al. (2007).

Franks et al. (2004) found that the overall economic conditions had some relevance, but other factors were much more important in their influence on recovery rates (as discussed above). They highlight that the relevance comes into play with view to realizing collateral, such as real estate, as depressed economic conditions can put pressure on asset prices.

In summary, there is some evidence that the overall state of the economy plays a role in recoveries, but it appears not to be amongst the most important drivers, which is based on rather mixed evidence.

2.3.10 LBO Cycle

The discussion up to this point has been focused on the individual characteristics of LBOs and their impact on credit risk. This sub-section now discusses whether there are cyclical patterns in LBO activity, which influence the appearance of these risk factors.

Overall, LBO activity and the specific exposition to risk factors is perceived to follow pronounced cycles, where high returns attract new money and drive up prices and reduce yields accordingly (Kaplan and Schoar; 2005; see also Kaplan and Strömberg, 2009). A consequence of this is that in order to keep yields at an attractive level, more leverage needs to be applied, which by definition increases the default risk by imposing additional contractual obligations on target companies. Axelson et al. (2013, 2010) describe three peak-levels for leverage throughout the LBO cycles that they identified to have taken place in the late 1980s and 1990s as well as between 2006 and 2007.[14] However, even more compressed time-frames indicate a degree of cyclicality in the LBO market.

Purchase multiples in turn are strongly correlated with leverage and a number of indications exist that the latter are driven by the ability of the market to absorb transactions. This for example can be inferred from Axelson et al. (2013), who performed a highly representative analysis (mainly LBOs in the US and Europe which took place between 1980-2008; the majority of the transactions being concentrated in the 2001-2008 bracket) and found a clear link between the debt load and purchase prices and demonstrate increases of debt loads in LBOs if there is a high availability of credit.

The chart on the following page illustrates the cyclical development of purchase multiples and debt multiples in LBO transactions.

[14] Leverage is typically measured by dividing the amount of debt by the EBITDA of the company.

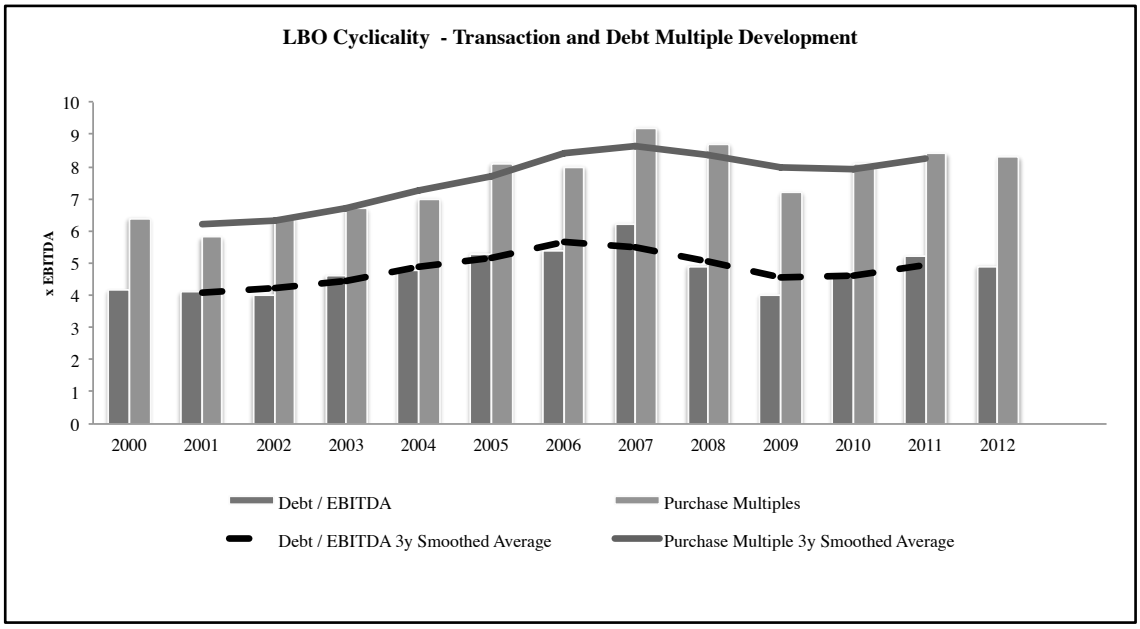

Figure 2-1: LBO Cyclicality, Transaction and Debt Multiple Development. Source: Author's own computations, Ernst & Young (2013).

Brinkhuis and De Maeseneire (2012) also found a significant negative correlation between the spread in the leveraged loan market and the amount of leverage used, providing support for the argument. Such a negative correlation was also found by Demiroglu (2008), as was a correlation between purchase multiples and the use of debt.

Since the above studies suggest that the availability of debt financing is a major determinant of pricing and leverage in LBO transactions, debt market liquidity can be viewed as an important consideration of default risk in LBOs. As leverage is a risk factor that influences recovery prospects, the point in the LBO cycle when a transaction is closed is likely to have an influence on its recovery rate in case that default risk materialises.

An important and related question is whether leverage is also determined by firm characteristics; which conceptually should be a fundamental driver of capital structure. Axelson et al. (2013), Brinkhuis and De Maeseneire (2012) as well as Demiroglu (2008) also followed this question, but with differing results. Axelson et al. (2013) found that firm characteristics such as operating risk (cash-flow volatility) or profitability and growth opportunities can explain leverage in a public-peer group of companies, but not in LBOs. For the public peers-group they use, they find that leverage decreases with

higher business risk and growth opportunities as well as with rising profitability. Brinkhuis and De Maeseneire (2012) also investigated this issue based on an initial sample of 126 European LBOs (slightly lower numbers for different measures due to data availability). Their findings were also consistent with those of Axelson et al. (2013), as they found several characteristics capable of explaining leverage in public companies, but they failed to do this for LBO firms. Taken to the extreme, this suggests that business fundamentals play a subordinated role in the structuring of LBO transactions with obviously important implications for credit assessment. In contrast, Demiroglu (2008) presented results to indicate that firm characteristics in LBOs are related to leverage. This discrepancy was already present when Axelson et al. (2008) had found a lack of explanatory power in a much smaller sample (153 LBOs). Relating to this smaller sample, Demiroglu commented that this discrepancy might be due to the fact that he (Demiroglu) only used public-to-private transactions and was therefore likely to be able to take account of firm characteristics more exactly. In contrast, Axelson et al. (2013, 2010) have matched the LBOs to industries and estimated their characteristics by assuming the median value for the industry as relevant for the LBO. Demiroglu's argument is plausible, but the size of the study by Axelson et al. makes this unlikely to prevail.

Based on a sample of 107 LBOs in the US (timeframe 1981 to 1990), Roden and Lewellen (1995) also found that firm specific characteristics play an important role in explaining the capital structure of LBOs. Pointing in the same direction, Opler and Titman (1993), using a sample of 180 LBOs that took place between 1980 and 1990, were able to show that companies are more likely to undergo an LBO when there is high cash flow and in parallel investment opportunities are depressed. This suggests that mature industry players with stability and good visibility on cash flows are the typical LBO candidates, which is an interpretation that is consistent with that of the ECB (2007a). Therefore, their study suggests that firm characteristics do play a role. Roden and Lewellen focus on public-to-private transactions. The majority of the transactions in the examples studied by Axelson et al. (2013) and Brinkhuis and De Maeseneire (2012) were private transactions. Mehran and Peristiani (2010) also found that firms that undergo a buyout show stronger free cash-flow and are more levered than public peers. In addition, they found buyout companies to have lower market/book ratios (author's

comment: which can be viewed as an indication of low growth prospects) but high profitability.

Much earlier, Kaplan and Stein (1991) looked at a number of 124 MBOs in the US and concluded that prices had risen towards the end of the 1980s, but that the risk in the transactions (based on variability measures) had not reduced. This at least provides support for the hypothesis that towards the end of a LBO cycle, firm characteristics play a less important role when transactions are structured. This would provide further support for the assumption that re-distribution risk is the more important aspect (see below).

An alternative possible explanation for the discrepancies in the studies mentioned is that they use largely different periods, which only partly overlap. The studies by Axelson et al. (2013, 2010) and Brinkhuis and De Maeseneire (2012, 2009) were more recent and therefore capture a large part of the most recent LBO cycle up to the year 2006/2007. Also, by this time, the business model of arranging banks was strongly focused on redistributing the risk (FSA, 2006; Deutsche Bundesbank, 2007). This possibility of redistributing the risk is being stated as a potential reason for bankers to reduce their efforts in transaction screening and surveillance (Acharya, 2007), which was supported by the high leverage contained in some of the transactions during the peak of the LBO cycle (similar to Acharya 2007). The ECB (2007a) in describing the results of a study by the Banking Supervision Committee (BSC) also stated that strong competition (*authors comment: which arises with large liquidity in the market*) could have led some participants in the market to exercise more tolerance in terms of lending standards and credit analysis. The same survey highlights the importance of an ability to sell down risks, and banks viewed the warehousing risk (i.e. the inability to sell down loans) as a primary concern. In 2007 the ECB highlighted that major arranging banks sell 50% of an exposure within five days from the commitment and the Bank of England gave a figure of 70% exposure that major UK banks sell down within 120 days from commitment of a leveraged loan.

At this point, a comparison to a previous cyclical peak shows some interesting common features (see also Acharya 2007 for a comparison of cycles). Kaplan and Stein (1991)

studied a sample of 124 MBOs that took place between 1980 and 1989. As part of their analysis, they also investigate the pricing of LBOs. While pricing is not that relevant for this research, an interesting point worth noting here is that they found a great level of homogeneity within the pricing of LBOs and as potential reasons point out that larger arranging banks are able to sell down exposures to smaller banks. So the ability to redistribute risks has also played a role in this LBO cycle.

In addition to the debt load, ample liquidity in the debt market also appears to lead to softening of other contractual features of LBO financing. The first one to mention here is the structure of the debt, which shifted towards the bullet structures in the years prior to the 2007 (Axelson et al., 2010). Brinkhuis and De Maeseneire (2012) highlight the use of the amortising tranche A and increasing use of tranches B and C (*authors comment: which are typically eight and nine years bullet tranches),* while second-lien debt has risen in use. Demiroglu (2008) also pointed this out.

The study mentioned previously by Axelson et al. (2013, 2010) also measured whether leverage is associated with the loosening of credit terms, utilizing data from a quarterly survey by the Federal Reserve. The authors point out that this qualitative assessment also captures covenants. Since they were able to confirm that there is a relationship between more relaxed lending terms and leverage, this serves as further support for the claim that covenant standards decrease during cyclical upturns in the LBO market. Acharya et al. (2007) also comment on the larger fraction of covenant-lite structures in the most recent LBO cycle compared to the previous one. The reduced importance of financial covenants since 2003 and a positive relationship of the restrictiveness of covenants with credit spreads had also been observed by Demiroglu (2008) or Demiroglu and James (2010).

Finally, the latest LBO cycle has also produced a never before witnessed number of transactions that have already undergone an LBO (secondary or tertiary buyout or recapitalisation; consistent with Kaplan and Strömberg, 2009), which are suspected to show higher propensities to default and lower recoveries.

2.4 Portfolio Management Tools at Credit Function Level

There exists a very large quantum of literature regarding credit portfolio management, but the largest part is focused on technical-mathematical models or takes a whole-bank perspective. The focus is typically on diversification and correlation implications, leading to discussions of Value-at-Risk (VAR) and Conditional-Value-at-Risk (CVAR) measures. Such papers have their merits, but are of limited use for this research and their applicability for credit functions is very limited. Their results are best used within central credit portfolio management functions that look at the entire portfolio of asset classes, of which LBOs would be part.

The focus of this research on the risk factors and how credit functions use them or should be using them would not be consistent with an evaluation of the technical-mathematical literature that exists on CPM as a whole. Additionally, the overall focus within credit portfolio management has shifted substantially in recent years. In particular has there been a strong focus on active credit portfolio management, i.e. adjusting the risk to a desired level. In 1999 Garside et al. described the evolution from passive credit portfolio management to active credit portfolio management. They state that historically, credit portfolio management focused on monitoring credit exposure by some sort of categorisation and potentially some exposure limits, but following the losses that banks experienced in the 1980s and 1990s, more sophisticated models using diversification and correlation assumptions have been developed.

Against this, since the financial crisis that emerged in 2007, there have also been comments and suggestions that indicate a renaissance of more simplistic measures to at least supplement the more advanced measures. A quote found in the magazine titled RISK (Vol. 21, p. 83) from a senior credit portfolio management professional illustrates this:

> *"If you get lost in the model, sight is lost of what is happening outside the model. While re-thinking the models is appropriate, they need to be linked to more traditional measures…including simple ones such as gross limits"*.

Quotes like this highlight that while it is viewed as useful to have highly developed technical models, the view of the individual credits and some traditional measures and how to include these in the credit management process still is important. This is the area

of work typically performed by credit functions. Literature focusing on rather simple measures is typically written by the consultancy community. Yet, it was possible to derive one measure from an academic study by Cotter and Peck (2001).

An obvious consequence from the experience made during the financial crisis that started in 2007 is that individual exposures need to be reflected against their impact on the overall portfolio, including concentration limits, while at the same time, these need to be practical to use (Thomson, K.; 2008; KPMG Basel Briefing). In its simplest form, a concentration analysis is simply breaking down the LBO portfolio using some kind of criteria, such as:

- %-age of secondary/tertiary transactions within the portfolio.
- %-age of exposures by jurisdiction.
- %-age of exposures by PE-firm.

A systematic review of these factors would make any concentration of the portfolio visible for credit functions and the impact of individual exposures on the total portfolio could be evaluated.

Two slightly more sophisticated measures were discussed by Percy-Dove (2008). These were average rating and credit duration. For the purpose of this research, they can actually, despite their undisputed shortcomings, be of high practical use. As the most simplistic measure she outlines (weighted) average rating of exposures within the portfolio. A rating (internal) is a relative measure of the risk of default and an average shows the central tendency of such a measure within a portfolio. Naturally, this in isolation does not reflect concentration risks. However, this can still provide very valuable insights from the viewpoint of a credit function when assessing new risks. For example:

- The development of the average-rating over time can flag developments in the credit quality.
- If exposure weighted ratings are used the impact of a newly assessed risk on a portfolio can be evaluated.

- It is possible to simulate the impact of a single credit deteriorating on the overall average portfolio rating. I.e. what happens if credit X receives a significant down-grade? If used in this way, the measure can provide information on the impact of risk concentrations.

A further measure that can be of practical use at the level of a credit function is credit duration. Duration is a measure commonly used in the bond market to measure sensitivity to interest rate changes. It represents the point in time when half of an investment has been returned to the investor, since at this point the investment would be immune to changes in interest rates (what is lost is gained by reinvesting on the other side). Percy-Dove also comments on this measure but in terms of the impact on the portfolio from a rise in credit spreads. Her criticism is that the measure assumes that credit-spreads widen by the same amount across the term-structure, which is an unrealistic assumption. However, the measure can still be used and provides valuable information for the purpose of analysing and tracking a default risk in LBO transactions. First, uncertainty rises with time. The longer the duration of a credit/portfolio, the higher the uncertainty is. Secondly, this can be related to the observation made earlier that at hike times of an LBO cycle, amortisation profiles become more relaxed which leads to duration-expansions. Hence, the monitoring of the duration of credits and the portfolio can provide valuable insights into the LBO cycle.

Since the preceding parts of the literature review have shown that the structure of the debt appears to be an influential factor on the credit risk and that structures change during the LBO cycle, a measure of seniority and changes to the seniority also appears to be useful. The study referenced earlier by Cotter and Peck (2001) provides a seniority measure that can actually be utilised for the purposes of this research. They classify the seniority of the debt on a scale of one to five, with one being the highest seniority and five being the lowest. The individual classes of debt in the structure are multiplied by their scale value and the total sum of this is divided by the total debt in the transaction.

The example on the following page illustrates the use of the seniority measure.

Illustration of seniority measure					
Total Volume	***Measure***	***Transaction A***	***Transaction B***	***Transaction C***	***Total***
Highest ranking	1	20	5	5	30
Second highest	2	0	0	5	5
Third highest	3	0	5	20	25
Fourth highest	4	0	0	0	0
Equity like	5	0	0	0	0
Total		20	10	30	60
Seniority Measure		**1**	**2**	**2,5**	**2**

Table 2-2: Illustration of seniority measure. Source: Author's illustration and interpretation, using seniority measure developed by Cotter and Peck (2001).

As becomes evident, transaction C receives a higher score on the seniority measure, indicating that there are substantial quantities of debt ranking below the senior. This measure could, for example, be used again for the analysis of concentrations or developments over time to reflect changes in the portfolio and/or to signal changes in the market. Given the importance of debt composition for recovery risk (Bos et al., 2002), such a measure can also be used to gauge the recovery prospects of the portfolio.

2.5 LBO Credit Risk Management Practices

The only results that were found relevant to this research dealing with LBO risk management practices within banks were those resulting from a survey carried out by the Banking Supervision Committee (BSC) of the European System of Central Banks in 2006 in response to the strongly rising activity in the LBO market by that time.

The key results of the survey can be summarised as follows:

- Overall, credit analysis and credit monitoring is performed incorporating many aspects of the risk factors.
- Within the analysis most of the attention is given to the cash-generating abilities of the business, i.e. the business-fundamentals and testing of downside scenarios.
- Leverage was viewed a factor of importance, albeit not in isolation.

- While covenants are important for monitoring purposes, on their own they do not provide for adequate monitoring.
- The analysis is largely based on historical data.
- Some banks do use a rating for each transaction.
- Some banks use limits for LBO exposures in aggregate/on a transaction basis, but some completely resist any limits.
- Collateral evaluation is part of the analysis in most cases, but normally its importance is viewed as much lower than that of business-fundamentals. This is explained by the LBO business being a cash flow based business.
- Monitoring is undertaken on a permanent and a credit-by-credit basis.
- Only a few banks report that monitoring takes into account portfolio considerations.
- In addition to covenants, further downside tests are performed in terms of the cash-generating ability of the company and to test headroom under covenants.

However, concerns about the credit work with regards to LBO credits have already been articulated in 2007. Then, the IMF (2007a, p. 15) wrote:

> *"…anecdotal evidence suggests the due diligence being performed by some investors (author's insertion: of LBO credits) may be weakening".*

Cao, Mason and Song (2010) provide evidence that goes in the same direction as outlined by the IMF. They bifurcate a sample of banks into high and low write-down banks and outline that in particular the latter had relaxed their lending standards during the years prior to the crisis. In parallel, these banks had significantly increased their market share and provided funding for lower quality borrowers.

2.6 Literature Summary and Synthesis

The literature review has pointed out:

- Generally, LBOs are considered to lead to improvements in performance and hence are an asset class suitable for debt finance (Section 2.2, p. 18). However, in particular more recent studies have found that this effect is lower than in previous studies or may not be present.

- Albeit with varying degrees of evidence, there is a well-established base of research regarding the risk factors in LBO transactions (Section 2.3, p. 23).

- Particularly regarding recovery risk, inferences had to be made. Research appears to be more advanced on the default risk component (Section 2.3, p. 23).

- There is significant support for the existence of an LBO cycle and this influences risk factors. Consequently, risk factors can signal the market becoming more or less risky for debt providers and the status of the LBO cycle should be an integral part of the credit risk management process (Section 2.3.10, p. 39).

- Although most of the literature relating to credit portfolio management takes a whole-bank perspective and is for portfolio management groups, some simple measures of portfolio management exist and are deemed to be capable of improving the overall transparency of the LBO portfolio, the early recognition of developments in the credit environment and the performing of impact analysis (Section 2.4, p. 44)

- Overall, the survey by the BSC suggested that credit analysis and credit monitoring for LBO exposures is extensive and detailed, focusing on many aspects of the transaction (Section 2.5, p. 47).

Improvements in operating performance have been suggested by a number of studies and practitioners alike. Guo et al. (2011) found that about 18.5% of the measured post-buyout returns were attributable to operating performance and cash flow generation is influenced by discipline and created by debt and governance changes. Acharya et al. (2013, 2008) were able to demonstrate that experienced PEs can generate returns in

excess of those of the average. Bergström et al. (2007) were able to show that profitability and efficiency improve following an LBO based on peer-group comparisons. Kaplan (1989) investigated operating performance improvements in the US and was able to identify strong uplifts in operating income and cash flow, in particular during the early years following a buyout. Practitioners also support the claim that LBOs show strong operating improvements, as exemplarily demonstrated by the study quoted from Ernst and Young. Avoiding the difficulties in using financial ratios, some studies have rather focused on operating efficiency at a plant level. Harris et al. (2005) and Liechtenberg and Siegel (1990) used such formats, considering total factor productivity. These studies have also shown substantial improvements in productivity.

Following the literature on LBO performance in general, the risk factors and the LBO cycle, the discussion highlighted some aspects of portfolio management. However, in general, modern portfolio management techniques have not focused on specialised products (Stegemann and Jamin; 2008; Dürr 2008). Also, following the experience gained during the financial crisis that began 2007, there has been some advocacy, in particular from risk management professionals, to at least take more simple measures of credit portfolio management that are easy to use on board again (e.g. Thomson, 2008). For this purpose, four simple measures have been suggested. These are concentration limits, average rating, credit duration and a seniority measure. Finally, the literature review summarised some results of a survey carried out by the BSC, which also covered the credit practices of large European banks in terms of LBO credits. In a very condensed form, the survey highlights that in general considerable effort is made to perform credit analysis and to monitor LBO credits, but that portfolio considerations potentially did not play a very important role.

2.7 Development of the Research Problem

The literature review showed that the ingredients for effective LBO credit management are present:

a) LBOs being a tested model to lead to improvements.
b) Risk factors in LBOs generally being well researched (particularly in terms of default risk).
c) Availability of simple measures of portfolio management.

d) Detailed and extensive analysis of LBO credit risks (with potentially some shortcomings regarding the use of portfolio management).

Surprisingly, at least to the author, the phenomenon that was observed in the years prior to the outbreak of the financial crisis (2007/2008) is not consistent with what has been found above: LBO structures became more aggressive and the credit market was able to absorb ever larger volumes of these exposures (e.g., Bank of England regarding the UK Bank; 2007b/Deutsche Bundesbank, 2007). While being cognizant that many explanations and contributors might be present, the role of credit functions as the unit in charge of analysing these credits within banks is worth analysing, as it appears that their work shows potential for improvement. This is the central research problem to be investigated as part of this thesis.

Chapter 3: Research Objectives and Methodology

3.1 Developing Research Objectives

To be able to decide on what methods and techniques to be used to answer the research question, i.e. how the research is designed, the first step was to transform the research question (and the aim) into more specific research objectives. These are then the basis for the decisions relating to data collection and analysis and place the research in a theoretical context.

The research aim was represented by two research questions where the second question (*"What potential measures can be deduced from the identification of areas for improvement within credit functions' assessment of LBOs' credit risk?*") is contingent upon the first one (*"Are there potential areas for improvement in credit functions' assessment of LBOs' credit risk?*"). The word *potential* in the research aim takes into account the exploratory nature of the research and some limitations in relation to data availability. The main findings of the literature review together with the comments received by interviewees are used to derive some potential measures to address potential areas for improvement in the work of credit functions.

Several potential explanations can be provided for the observed phenomenon. These are discussed below here and research objectives addressing these are provided. The final research objective is then to draw conclusions from the findings with regards to the identification of areas for improvement.

Recognition of risk factors: While a number of risk factors have been identified, credit functions may not be cognizant of them or judge them differently with regards to their importance. Alternatively, the most recent LBO wave may have flagged additional risk factors that have not been covered by the literature so far and are only known about now. A lack of awareness of the risk factors or their importance would automatically result in them not being considered sufficiently in the credit management process and therefore would constitute an area for improvement. This can be addressed with the following research objectives:

- **Research objective A1:** To investigate whether there is an awareness of the LBO cycle and whether its importance is recognised.

- **Research objective A2:** To investigate which (other than the LBO cycle) risk factors are viewed as the most important ones for credit risk in LBOs.
- **Research objective A3:** To analyse how the risk factors identified in the literature review are judged in terms of importance for the credit risk.

Inconsistency between importance and use of risk factors: The literature has flagged the risk factors. It could be that credit functions are aware of them, but still do not use them in the credit management process or at least do not use them to the degree that their importance would suggest. If this were the case then it would represent another area for improvement. This can be expressed by the following research objectives:

- **Research objective A4:** To investigate the risk factors credit functions mainly focus on when assessing LBOs.
- **Research objective A5:** To investigate if there is consistency in terms of the importance of risk factors and their use in the credit management process.

Low level of integration: The literature synthesis also reported survey results that the work on LBO credits is very detailed and takes into account many aspects of these transactions. However, there might be a lack of integration between the various aspects of the credit management process; including the use of aspects of portfolio management. For example, in order to provide a sensible basis for decisions relating to portfolio management, credit monitoring would have to constantly feed information for this, which is also to be utilised in credit analysis. A low level of integration would represent an area for improvement.

- **Research objective A6:** To investigate whether the credit management process is sufficiently integrated to take advantage of aspects of portfolio management.

Finally, logical deduction suggests that the above areas might offer potential for improvement, yet it could be that none of the above applies. Being exploratory research, the research has to cater for this aspect as well.

- **Research objective A7:** Are there any (additional) weaknesses and areas for improvement present in credit functions' management of LBOs?

Ultimately, this research aims to derive some potential measures to address these areas for improvement to enhance the effectiveness of the work on LBO credits by credit functions:

- **Research objective B:** To integrate the results from research objectives A1-A7 and deduce potential measures to address identified areas for improvement.

What is important to note is that research objective B is not intended to provide recommendations. This is for two reasons. First, before any of such could be expressed, further validation and a form of triangulation would be required (see Sections 5.4 and 5.5, pp. 132, 133). Secondly, not every finding may apply to every credit function. These ideas therefore provide solidly deduced starting points to consider; i.e. should enable credit functions to identify any areas for improvement in their own work more swiftly and allow them to find ways to address them where applicable. In individual circumstances, some of these may prove to be relevant and irrelevant in others. Further research may also refute some of them, while others may be confirmed and additional ones added. This is reflective of the exploratory nature of the research.

3.2 Research Paradigm and Research Design

The research methodology is also influenced by the research paradigm. The two opposing paradigms found in business research are positivism and interpretivism (Collis and Hussey, 2009). In the former, knowledge is produced based on empirical evidence or logical derivation (Roberts et al., 2009). In contrast, the latter allows subjective interpretation for observed phenomena. Due to the nature of the data produced, positivist research typically uses a deductive approach (using quantitative data) whereas interpretivism typically follows inductive analysis (using qualitative data), although this is not an absolute necessity. This research contains elements of both paradigms as reflected in the research design.

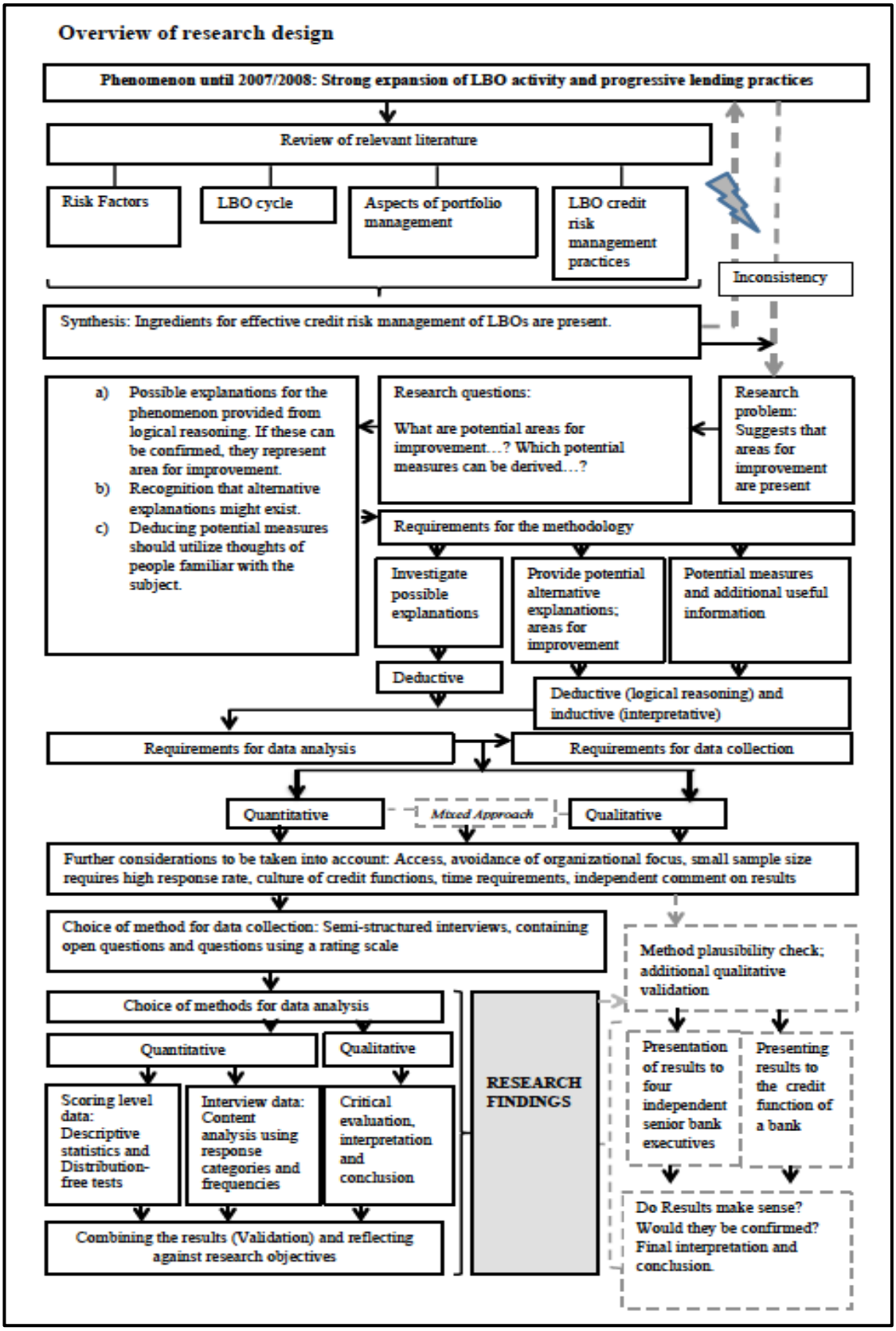

Figure 3-1: Overview of research design. *Source: Author's own.*

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The research design has to be appropriate to achieve the research aim and its objectives. The research design is illustrated in Figure 3-1. The initial observation was that in the years prior to the outbreak of the financial crisis in 2007, LBO structures became increasingly risky for lenders. Despite this, lending to LBOs increased sharply both in terms of cumulative volumes and transaction size. Lending practices had received some criticism and following the outbreak of the financial crisis the consequences projected by some market experts (see Introduction) materialised. To study the phenomenon and the role of the credit function, the relevant literature was reviewed. The synthesis of this was that all the ingredients for the effective management of LBO credits are present, but this did not appear to be consistent with what had actually happened, as described previously (indicated by the grey dotted arrows in Figure 3-1). Already in 2006, warning statements about high leverage were made by the Deutsche Bundesbank (2006) or the FSA (2006), but the market yet expanded and leverage multiples continued to go up (see Ernst & Young, 2013, Figure 2-1, p. 40) and in 2009 problems started to unfold with high amounts of distressed leveraged credits on the books (ECB, 2009, see Introduction) and many of these transactions requiring amendments or restructurings (PWC, 2010). From this, the research problem, the research questions and the research aim were developed. The research questions were transformed into an overall research aim.

As a preparatory step to the research design, several potential explanations for the phenomenon under study have been offered from logical reasoning. It was then argued that if these can be confirmed, then they would be an area for improvement and how to address them should be part of the potential measures to be deduced. This follows a positivist and deductive approach; attempts were made to find support for the potential explanations. While some explanations were offered, it was recognised that there might be further, less obvious ones present. This also had to be catered for and also required some interpretivist elements. Also, the potential explanations included analysis of qualitative interview data, which has an interpretative element. At a later stage the findings were combined to show interdependencies between them, which also follows an inductive, interpretative approach. Once this has been established, measures to address any areas for improvement are deduced by logical reasoning and interpreting results received from interviewees at a conceptual level.

Related to the paradigms to be followed is the question of the methods of data collection and analysis. The desired data analysis influences the data collection and what kind of data is produced also influences the number of analysis techniques.

As a data collection method, semi-structured interviews were viewed the most appropriate since the method ensured a high response rate, which was particularly relevant in terms of the small sample size of 18 participants and as it was possible to collect quantitative and qualitative data with this method. More details relating to data analysis are provided in Chapter 4.

The mixed method approach was also considered most appropriate to make the results more robust. In exploratory research with limited sample sizes, reliability is always an issue. It is possible that follow-up studies on larger samples come to different results. Validity calls for the study measuring what it is intended to measure in order to provide responses to the research questions (also see e.g. Collis and Hussey, 2009). Validity can be enhanced if the data is collected in different formats and analysed via different techniques. This was applied within this study as both quantitative and qualitative data was collected and analysed with the results actually supporting each other (see Section 4.1, in particular Section 4.1.4, pp. 74, 83). Moreover, the risk of measurement error was largely mitigated by carefully testing the questions and having had another expert in the field commenting on them (see Section 3.3.2, p. 59) as part of the pilot phase. Validity of the results (and generalizability) was further enhanced by two measures which were a) the discussion of the results with four independent experts and b) a group presentation to a bank's credit function.

Therefore, similar to what is typically found in studies structured under Grounded Theory, the study has many alterations between inductive and deductive methods. In terms of quantum, the positivist approach dominates but the key element of the research findings that ties individual results together to show interdependencies had to follow an inductive, interpretative approach.

3.3 Data Collection

3.3.1 General Instrument Decision

The decision to analyse the data via semi-structured interviews resulted from the overall requirement for the data to be analysable in qualitative and quantitative form and at the same time served to ensure a full response rate due to the limited sample size. This meant that the interview-questionnaire had to consist of open questions as well as data that would typically be found in a survey, where participants were asked to rate their views on certain aspects on a scale.

Dürr (2008) has adopted a similar approach in his doctoral thesis regarding credit portfolio management. The arguments outlined by Dürr (2008, p. 199) can be echoed for the purposes of this research. Dürr referenced the subject of his research to be marked by "high complexity", "comparably small sample size" and "very limited access to the field of ACPM by means of publicly available sources". Other researchers have also used interviews and surveys to perform analyses of LBO related subjects. For example, Acharya et al. (2013, 2008) included an interview approach in their study on the effects of corporate governance and private equity performance (trying to find the distinguishing factors for superior returns). In a working paper by the Frankfurt School of Finance and Management, Bannier and Müsch (2008) use a multiple-choice survey (similar to the proposed survey-part in this research) to investigate the effects of the financial crisis (starting 2007) on the German LBO market for small and mid-cap transactions. Market expert institutions have used surveys on specific subjects of the LBO market, for example the BSC used a survey approach to investigate LBO lending by banks (Deutsche Bundesbank, 2006; ECB, 2007a). While using a quantitative approach themselves, Bergström et al. (2007) highlighted the complexities of the subject and the difficulties in quantifying certain effects. Broadening the scope of the research from LBO related to finance related research, an interesting statement was made in a paper by Tucket (2011a; 2011), who studied the role of stories on financial markets. He argued strongly in favour of interviews as a way to generate data directly from individuals acting as "*economic agents*", since those who take action in the market actually define how markets work and react (Tucket, 2011a). A similar case can be presented for this study. Credit functions consist of individuals and their view of risk

factors and their use in the credit management process will determine how credit functions work in the marketplace.

3.3.2 Instrument Development

The research aim was broken down into a number of research objectives, which had to be covered as part of the data collection process. The table below matches the research objectives to the questions in the interview-questionnaire.

Matching of research objectives against questions contained in the questionnaire	
Research objective	**Question(s) mainly addressing the research objective**
Several research objectives generically:	1.1 (aimed at starting the discussion) 4.0
Research objective A1: To investigate whether there is an awareness of the LBO cycle and whether its importance is recognised.	1.2 in combination with questions 2.2-2.10.
Research objective A2: To investigate which (other than the LBO cycle) risk factors are viewed as the most important ones for credit risk in LBOs.	1.3 in combination with questions 2.1-2.10.
Research objective A3: To analyse how the risk factors identified in the literature review are judged in terms of importance for the credit risk.	1.4 / In combination with questions 2.1-2.10.
Research objective A4: To investigate the risk	1.5 / 2.1.

Matching of research objectives against questions contained in the questionnaire	
factors' credit functions mainly focus on when assessing LBOs.	
Research objective A5: To investigate if there is consistency in the view on the importance of risk factors and their use in the credit management process.	2.1-2.10 (Scoring levels) and cross-checked with question 1.2.
Research objective A6: To investigate whether the credit management process is sufficiently integrated to take advantage of aspects of portfolio management.	2.1-2.10 and cross-checked with question 1.3.
Research objective A7: Are there any (additional) weaknesses and areas for improvement present in credit functions' management of LBOs?	2.1-2.10 / 3.0.
Research objective B: To integrate the results from research objectives A1-A7 and deduce potential measures to address identified areas for improvement.	Critical evaluation of the foregoing results.

Table 3-1: Matching of research objectives against questions contained in the questionnaire. Source: Author's own.

3.3.3 Testing and Validating the Research Instrument

Once a first version of the questionnaire had been produced, it was carefully tested with the following aims:

- Ensure content validity and simultaneously aim to improve the questionnaire.

- Provide a first set of data for the research in order to assess its suitability for analysis.
- Provide a first induction for the researcher in conducting those interviews.

The test was conducted in two stages. The first stage was the provision of the questionnaire to a senior credit executive for commentary in December 2010. This senior credit executive has more than 20 years of experience in various credit roles and supervisory responsibility for several department heads who lead analytical groups. Following this person's comments, some changes were made to the sequence of the open questions and in some aspects these were made more precise.

The second step was to test the instrument in a live-format. For this purpose, three individuals with substantial experience in LBO credit were selected and interviews were performed.

The most important amendment made as a result of this relates to the descriptors and to the questions where people were asked to provide a scoring level for the degree to which risk factors are taken into account in the credit management process. The change is illustrated below by comparing the original question and the descriptions and the amended version.

Original Question and Descriptors (exemplary extract):

What role does risk factor XYZ play in credit analysis, credit monitoring and portfolio management?

Rating: / **Role in:**	**Very significant role (5)**	**Significant role (4)**	**Considered, sometimes significant role (3)**	**Factor considered, but not significant (2)**	**No role at all (1)**
Credit Analysis					
Credit Monitoring					
Portfolio Management					

Amended Question (exemplary extract):

"To what degree do you think risk factor XYZ is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this risk factor (i.e. point in the cycle, concentration of transactions by vintage year etc.)?"

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of portfolio management					

This amendment was made because the original wording of the question and the descriptors for the scale were felt to be misleading. In particular, the question relating to portfolio management proved to be potentially misunderstood in a sense that the interviewees would relate to a central credit portfolio management function rather than the specific activity performed by credit functions.

Other than the above, a further outcome from the test was that there was a significant time requirement, with the initial interview taking almost three full hours. This was attributed in part to additional explanations being required, but also to some issues relating to staying focused. Once the changes had been made and more discipline applied, the interview time was reduced substantially, lasting between 45 minutes to approximately 2 hours, with the majority running between 75 and 90 minutes.

Further results of these initial interviews were that the data could generally be analysed using some descriptive statistics and some interpretations. Originally, it was intended to present the results of this test as pilot study results. Later, this idea was aborted for the following reasons:

- Given that there were only three participants in this testing phase, the data did not warrant any meaningful statistical analysis.
- Even interpreting the results of qualitative questions would be difficult based on the limited number.

Instead, the results were interpreted to suggest that the potential explanations were at least plausible and that the data can be analysed, provided that the number of participants is increased. Therefore, it was decided to analyse the results of these three participants together with the whole sample. The concern that these three people answered slightly different questionnaires is mitigated by the fact that these interviews took substantial time and that the intention of what was to be measured was explained at length and therefore their responses relate to what was actually meant to be measured, avoiding any misunderstanding that there might be in the wording.

3.3.4 Sample Selection and Details

Credit functions are difficult to reach and banks' willingness to participate in such research projects is typically limited. Access to the participants was only possible because of the personal contacts of the researcher and therefore this acted as a convenience sample. This sample consisted of 18 participants.

The use of a convenience sample creates issues in two areas. First, it might impact the objectivity and neutrality of the researcher. Specific care had been taken to protect this.

The second issue with using convenience samples is that they may not be representative and the data might be skewed towards the views of the specific group and not lend itself to generalization. This is an inherent issue in research based on small sample size, which is frequently the case for indicative and exploratory research. This was viewed as acceptable because of:

- The focus of the study
- The varied background of the participants
- The uniqueness of the opportunity

- The exploratory nature of the study
- Practical considerations

Each of these points is expanded on below.

Focus of the study:

Participants were asked to respond to the various questions with what they viewed would be the market practice for credit functions and each participant him or herself was the unit of analysis. This is a substantial difference to studies where each unit of the sample is an organisation, that have the aim of finding out how specific **organisations** do something, or alternatively, those that try to find out how the market works by sampling the (entire) market directly by asking a representative sample of organisations to participate. Such studies are valuable, but results should also be treated with caution. First, access is often problematic in such studies. Organisational involvement is unlikely to be received from a sufficiently large number of institutions. Secondly, and in the view of the researcher, a much more severe drawback is that the answers are likely to be controlled in some way. There would be a risk that the participating organisations would aim to answer the questions in a way that creates a positive picture about them. Thirdly, even if an organisation answers the questions to the best of its knowledge, this could still be different to how it is actually done in practice in general and also by the organisation itself. All of this is overcome by the approach taken in this research.

Background of participants

Dictated by the focus of the research, the most relevant consideration in relation to participant selection for validity and reliability was the ability of participants to judge how something is done in general by credit functions. That is: "*what do the analysts actually focus on and how much weight do they assign to the relevant risk factors in the credit management process?"*

An informed view of this can be formed by either having done the work of the credit function personally or from having significant professional interaction with credit functions or a combination of both.

Since the research is not organisation specific, the cumulative personal experience of participants is worth considering when judging the validity of the research. The different positions of participants meant they had a more varied view of how something is done in the marketplace. Also, the interaction with credit functions is likely to be higher if people have experience from several employments, since there might be different interlocutors from each type of employment.

Most of the participants have had more than ten years of cumulative experience in the credit business, with significant exposure to LBOs. The participants have held 33 jobs in total in which they had significant exposure to the LBO credit business. Of these 33 jobs, 21 were at banks. These 21 jobs at banks were at a total of nine *different* banks, all of which were large players in the European LBO market in the last ten years with significant exposure to the German market.

Summary Background of Participants

		NoE LBO Ex.	Thereof Bank	Banks
Participant 1	Finance Lawyer	2	0	n/a
Participant 2	Rating Analyst	2	1	A
Participant 3	Credit Function Analyst	1	1	B
Participant 4	Rating Analyst	2	0	n/a
Participant 5	Rating Analyst	3	2	C, D
Participant 6	Deputy Department Head Credit Function	1	1	B
Participant 7	Debt Advisor	3	2	B, C
Participant 8	Credit Function Analyst	1	1	B
Participant 9	Department Head / MD Credit Function	1	1	B
Participant 10	Credit Function Analyst	1	1	F
Participant 11	MD Structuring Team	2	2	A, G
Participant 12	MD Structuring Team	2	1	A
Participant 13	Senior Syndication Professional	2	2	A, C
Participant 14	Senior Syndication Professional	2	2	A, H
Participant 15	Debt Advisor (Previously MD Structuring)	2	1	C
Participant 16	Department Head / MD Credit Function	1	1	F
Participant 17	Debt Advisor (Previously MD Structuring Team)	3	2	I, H
Participant 18	Finance Lawyer	2	0	n/a
		33	21	A - I: 9

Table 3-2: Summary of background of participants. Source: Author's own.

The Column NoE LBO Ex. shows how many jobs the participants have had with some exposure to LBOs. The column "Thereof Banks" shows how many of these were at banks and the column "Banks" in the title above shows at which bank in anonymous form. For example, a total of four participants in the study had worked for bank A in the past or are working for bank A presently.

Regarding geographic distribution based on ultimate headquarters of these banks, four were based in Germany, two in Italy, one in France, and two in the UK (with one bank where the European headquarters is based in the UK while the global headquarters was outside the UK). With the exception of one interviewee who was based in London, participants were located in Germany. Credit functions of these banks were partly located at the German headquarter of these banks, at a German operation where the ultimate headquarter was outside Germany or at the foreign headquarter directly. Also, for at least three banks in the sample the German headquarters was ultimately in charge for the credit management of all the LBO credits undertaken in Europe.

Based on the last position prior to the interview, the composition of the participants can be broken down as follows: Bankers (ten; 67%), rating analysts (three; 17%), debt advisors (three; 17%) and finance lawyers (two; 11%). One participant had assumed a different role (with no direct LBO exposure) shortly before the interview; all other participants were in the functions described above at the time of the interview. The group of bankers can further be broken down into credit analysts (six), structuring professionals (two) and syndication professionals (two).

Credit analysts are those working directly at credit functions. Within the group of six analysts, two interviewees were actually heads of credit function teams. Hence, their experience came from their own work as analysts and from their observation as supervisors of other analysts and their view on how their colleagues in the market perform their work.

Syndication professionals are viewed as particularly knowledgeable about the market since their task is to sell exposures in tranches to other market participants. To achieve this, they typically get involved at the early stages of the structuring of transactions, which need to receive sanctioned by credit functions at a later stage. At this stage, they try to make sure that the structure that is designed is sellable in the market. As such, they have a great level of appreciation as to what the most critically viewed risk factors are and what credit functions focus on. This applies to both their own organisations as well as to potentially participating banks in the market.

Structuring professionals work closely with credit functions since they need their transactions to get approval or to at least be supported by them. Moreover, at least in the

past, many transactions were lead-arranged by more than one bank (typically two-four) and the ultimately designed structure of the transaction had to meet the requirements of all banks involved (and potentially participating banks at a syndication stage). Therefore, they also have specific knowledge about the aspects relevant to credit functions and of how this is done in the market.

Rating analysts are frequently asked by credit functions about particular aspects of certain credits or the market in general. They also produce research on individual credits on market developments, which requires deep knowledge of the subject. From the type of questions they receive, they can also make informed judgments about which risk factors are viewed as highly relevant and what people focus on in the credit management process. Within the group of rating analysts interviewed, one person solely focused on LBOs and spent the majority of his time on structural developments in the market. The other two rating analysts had a specific sector focus. Two of the rating analysts have also had significant LBO exposure from previous roles within banks.

Finally finance lawyers get involved as advisors to arranging banks and to participating banks, typically with their interlocutors being the credit function or the structuring function. Further, due to their involvement in restructuring negotiations, they get to see transactions that went into default and from this develop a solid understanding of the risk factors that credit functions (should) focus on.

Relating to the employment at the time of the interview, of the 18 participants, a total of ten were employed with four banks and seven were concentrated between two banks, reflecting some concentration. The impact of this is limited because of the nature of the research not focusing on specific organisations and the fact that of the ten employees, six have had experience at other banks from previous roles. In addition, the total number of different banks that participants had worked for was as nine. While this indicates some overlap, participants sometimes worked at those banks at different times from one another.

With some exploratory research having smaller sample sizes and frequently being concentrated on a single organisation, there are also good arguments in favour of validity. In comparison, the standard organisation focused research frequently also uses a limited sample size. Dürr (2008) focused on 22 organisations. The Deutsche

Bundesbank and the Financial Services Supervisory Authority in Germany carried out a survey on LBO credits with six German Banks active in the field as part of their contribution to the wider BSC study (2006). The overall BSC survey did include 41 banks.

Uniqueness of opportunity

Access to a group with the characteristics as utilised in this study is typically not available to researchers. The participants were all at least at their mid-career stage, with some of them holding management positions and working to tight schedules. Publicly available information on the subject is very limited. A sufficiently large number of participants from a random request to a large number of organisations was unlikely to be obtained. Bryman and Bell (2007) state that using convenience samples is acceptable in those circumstances where their use offers a good opportunity which may otherwise not be available. This was exactly the case here.

Practical considerations

Ultimately, this research aimed to deliver results that can be used by credit functions in a practical manner. As such, the results would never be final in a sense that what will be suggested represents an end-point. In contrast, results must be expected to continuously develop or might actually be overturned by new research. Recognizing that circumstances for research are never perfect, this was not deemed a sufficient reason to refrain from carrying out this study.

3.3.5 Interview Process

Interviews with the 18 participants were carried out during the period between March 2011 and April 2012. The majority of the interviews was carried out between January 2012 and April 2012.

This rather long timeframe for gathering empirical data is owed to specific circumstances. First, the time requirement to analyse the interview data was rather long, in particular during the early stages of the process. More importantly, a very time

consuming aspect was simply the availability of the participants. Several interviews that had been scheduled were required to be re-arranged, sometimes more than once, due to important work commitments of the participants. This led to significant deviations from the originally envisaged interview timetable. Such delays are commonplace in research that is contingent on participants who ultimately act altruistically by participating. The potential impact this could have on the timeliness of results is mitigated by the research focusing on the full cycle prior to 2007 and the later plausibility checks carried out with the independent senior credit executives.

Schedule of Inteview Dates		
Participant 1	Finance Lawyer	March 2011
Participant 2	Rating Analyst	March 2011
Participant 3	Credit Function Analyst	April 2011
Participant 4	Rating Analyst	January 2012
Participant 5	Rating Analyst	January 2012
Participant 6	Deputy Department Head Credit Function	January 2012
Participant 7	Debt Advisor	Janaury 2012
Participant 8	Credit Function Analyst	February 2012
Participant 9	Department Head / MD Credit Function	February 2012
Participant 10	Credit Function Analyst	February 2012
Participant 11	MD Structuring Team	February 2012
Participant 12	MD Structuring Team	February 2012
Participant 13	Senior Syndication Professional	March 2012
Participant 14	Senior Syndication Professional	March 2012
Participant 15	Debt Advisor (Previously MD Structuring)	March 2012
Participant 16	Department Head / MD Credit Function	March 2012
Participant 17	Debt Advisor (Previously MD Structuring Team)	March 2012
Participant 18	Finance Lawyer	April 2012

Table 3-3: Interview Time Schedule. Source: Author's own.

Of the 18 participants, 17 were first contacted by telephone. One person could not be reached via phone and the first contact was made via email. During these first contacts, the broad purpose of the research was explained and appointments scheduled.

Interviewees were offered to receive the questionnaire in advance, which most of them requested.

Places for the interviews were chosen to avoid the participants having to travel. Of the 18 interviews, fourteen took place at participants' places of work and two at cafes near their places of work. This is a total of 16 interviews that were conducted in a face-to-face type of setting. Two interview appointments with participants that lived and

worked at a significant distance from the researchers' residence had to be postponed at short notice. Finding an alternative date for these two interviews to be done in person would have had a further detrimental effect on the timetable. Therefore, these two interviews were conducted by telephone. Telephone interviews can be arranged with less cost and more conveniently for those involved but have the obvious disadvantage that parts of the communication (i.e. reactions to certain questions, or interactions during the interview) cannot be fully captured. Therefore, from a research perspective the data is somewhat less open to interpretation; however the research notes did not differ significantly from those resulting form the in-person interviews.

The researcher interviewed all the participants personally. One interviewee brought a more junior colleague along. However, as they agreed on the answer before formally confirming it to the interviewer, they were counted as one participant in the sample counting.

All interviews took place in German. Typically, interview-based research takes advantage of recording so that the researcher can go back to the raw-data several times to ensure the interpretation is correct and to reflect on the data again after some time has passed. A drawback of recording is that some interview candidates may not be comfortable with it at all and ultimately decide not to participate. As this was an exploratory study, it was important not to lose participants. For the reasons of this research being exploratory in nature and to the best of the knowledge of the researcher the first of its type, it was also considered important that the answers received by the participants were as open as possible and not controlled. Therefore, the decision was taken not to use recording.

Instead of recording, handwritten research notes were taken during these interviews. These were not strictly verbatim what the participants had said, but instead focused on the main highlights during each interview and the views expressed during any discussions. Sometimes these contained small graphs when a subject was discussed with participants and a graph was used for illustration or to re-iterate that what the interviewee was expressing was properly noted. As soon as possible after the interviews – usually the same day to ensure the data was still fresh on the researcher's mind – English summaries were produced. These took into account the written notes but also the memory account of the researcher. These summaries on average were about 1,000

words on average (up to 1,500 words in some cases) in length. These summaries were then used as the raw-data to allocate responses to response categories (Example included in Appendix 3, p. 169).

This method of data collection certainly has a risk of bias and also of data loss in the process. But the disadvantages associated with recordings the interviews were viewed to severe to follow this route. To mitigate the risk of biases or data loss, the researcher made every effort to keep neutral during the process. Since more than half of the questionnaire required respondents only to allocate a scoring on a scale of 1-5 there was sufficient time to do this. Two examples of the English language summaries are included in Appendix 3 (p. 169).

3.4 Research Ethics

Ethical aspects are an important part of a research programme. The researcher acted with honesty and integrity at all times and has taken measures to ensure these principles are adhered to. Specific measures were designed to ensure professionalism and to maximize objectivity and neutrality to the greatest degree possible. This relates particular to the use of a convenience sample.

3.4.1 Disclosure of Support

Any support that the researcher received was disclosed in advance to the university. In line with the university regulations, the researcher does not view any of the support received to be in conflict with the requirement that the thesis be substantially the candidate's own work.

During the majority of this research project and in particular during the empirical part, the researcher was himself employed in a credit role within a bank, albeit without any involvement in LBO credit risk while the empirical research was conducted. The researcher was able to accumulate overtime hours and take time off in compensation for these hours to allocate time to the research project. This proved to be particularly useful where parts of the research project had to be performed during normal business hours. Also, the researcher had access to a good corporate library, where parts of the literature could be obtained. While this is no different from using another academic library, it was

a clear advantage to have the library in the same building as the candidate's place of work. For the avoidance of doubt, the library did not assist in the selection or evaluation of literature in any way.

3.4.2 Ensuring Informed Consent

The researcher's employment in a bank and support received from his employer was disclosed to participants openly prior to each interview to cater for any concerns that the data could be shared with colleagues of the researcher. Assurances were given that the researcher had control over access to data and that participant's interests would be considered (see below).

3.4.3 Protection of Participants' Interests

The participants' interests had to be protected and the potential disadvantage due to some participants receiving the results later than others (namely those outside the researcher's organization, see above) had to be balanced or mitigated. The researcher had full control over access to the thesis during the research project and draft research results were only made available in aggregated format to certain people in order to get feedback or for validation purposes (last time in 2012). No information pertaining to or received from individual interviewees was disclosed. In addition, the research was based on a series of carefully designed research rules (see questionnaire, Appendix 2, p. 154).

The research was not aimed to be specific to any organization and the interview questionnaire stated that participants should express their views about what they see as the market practice. Despite this, the research rules encouraged participants to seek approval from their employer in case they thought their participation could be an issue. To the best knowledge of the researcher, no participant thought this was necessary.

3.4.4 Preserving Participants' Anonymity and Confidentiality

Assurances were given that the information provided by the participants was only processed in an anonymous format. For this purpose, the names of the participants were

not recorded on the questionnaires or in the research notes. Regarding confidentiality, the participants were informed that their participation in the research would remain confidential and would not be disclosed to anyone unless they specifically consented to this. For this purpose, the participants were requested to choose whether they agreed to have their name as a participant mentioned in the thesis, only to be disclosed to Heriot-Watt-University or for it to remain completely confidential. All participants agreed at least to the disclosure of their identity to Heriot-Watt-University and agreed to be contacted by the university and to confirm their participation, while some agreed to be mentioned in the thesis.

Chapter 4: Data Analysis and Research Findings

4.1 Data Analysis

Based on the mixed data generated this study used techniques for quantitative and qualitative data analysis. The former mainly related to scale data, and the latter to interview data.

4.1.1 Analysis of Quantitative Data (Scale Data)

Scale data is analysed quantitatively using:

- Descriptive statistics
- A Distribution-free test (Friedman Test)

The analyses were conducted using a standard statistical software package, which is also briefly described below.

Descriptive Statistics

In a first step, data was organised and summarised in tables. The questionnaire contained questions that asked participants to score a certain risk factor with view to:

- The importance of risk factors for default risk.
- The importance of risk factors for recovery risk.
- The degree to which risk factors are used in credit analysis.
- The degree to which risk factors are used in credit monitoring.
- The degree to which credit analysis and credit monitoring take into account aspects of portfolio management (with view to the specific risk factor).

The data resulting from the questionnaire in response to these aspects was organised in tables, which show the following:

- The total number of data-points per question and across a category. This is 18 in most instances, but in a few instances participants did not answer a certain

question. In these cases, there might be fewer than 18 data points in response to a specific question.

- The absolute number of times a scoring level was assigned to a risk factor as well as the percentage distribution of risk factors relating to the aspects mentioned above.
- Statistical measures of location and dispersion that include the highest and the lowest scoring levels as well as the range between them as a measure of data dispersion. Median, mode and arithmetic mean levels have also been provided.
- The percentage distribution of the scoring levels assigned for each risk factor as well as in total to any category (i.e. importance for default risk, importance for recovery risk, use in credit analysis, use in credit monitoring and the degree to which credit analysis/credit monitoring take into account aspects of portfolio management with view to the risk factors) across all the risk factors is shown illustrative bar-charts.

The relative distribution of scoring levels for each risk factor with view to the importance for default risk and recovery risk addresses several research objectives. These are research objectives A1 (To investigate whether there is an awareness of the LBO cycle and whether its importance is recognised), A2 (To investigate which - other than the LBO cycle - risk factors are viewed as the most important ones for credit risk in LBOs) and A3 (To analyse how the risk factors identified in the literature review are judged in terms of importance for the credit risk). If the LBO cycle and the other risk factors identified receive high scoring levels, this supports that there is awareness of them. Those frequently receiving high scoring levels are likely to be viewed the most important ones (A2), except additional ones which may exist and which are addressed as part of the analysis to open questions. The scoring levels assigned also show how the risk factors are judged in terms of relative importance, one against the other, which can be compared to the conclusion of the discussion in the literature review and in part research objective A5 (To analyse how the risk factors identified in the literature review are judged in terms of importance for the credit risk).

Showing the frequency distribution for the scoring levels assigned for the degree to which risk factors are used in credit analysis and in credit monitoring shows if some receive considerably more attention than others. This addresses research objectives A4

and A5. Those which receive the highest scoring levels are obviously the ones credit functions mainly focus on, as articulated by research objective A4 (To investigate the risk factors credit functions mainly focus on when assessing LBOs). Research objective A5 (To investigate if there is consistency in the view on the importance of risk factors and their use in the credit management process) is addressed here in a number of ways. Intuitively, one would expect that those rating factors that receive high scoring levels with regards to their importance also receive high scoring levels on the degree to which they are used. Following the same argument, due to their importance, analysis and monitoring would take advantage of measures of portfolio management to a significant degree. Such differences are shown if the data distributions are compared, for example, comparing the distribution for the importance of the LBO cycle on credit risk with that for its use in credit analysis. However, such an analysis must truly be viewed as intuitive. For example, if it had been found that most participants rated the LBO cycle highly in terms of its importance and low regarding its use in the credit management process, this would be interesting as it could indicate that the LBO cycle is not receiving the attention that its importance would suggest. The difficulty is that the scale measures different aspects. Participants were asked to score the importance of risk factors on the credit risk and the degree to which they are used. The scoring level descriptors were different. For example, a participant may score the importance of a certain risk factor as five and its use in the credit management process as a three. This appears to be an inconsistency, but the participant may actually believe that the scoring level of three on the use of a risk factor is the most appropriate for a factor that is rated at five for its importance. Research objective A5 is more directly and with less difficulty addressed when comparing the scoring levels for the degree of use in credit analysis and credit monitoring, since the scales and the descriptors here are the same. Any discrepancy here would actually point at different attention being given to a risk factor in each of the parts of the credit management process.

Bar charts are used to illustrate the relative frequency of the total distribution of scoring levels assigned for each risk factor and the total within each category.

The distribution of the scoring levels relating to their use in credit analysis and credit monitoring shows the degree of use in aggregate across the rating factors. If it was discovered that overall their use is low, this would require further investigation but

would also be of high relevance for research objective B and the second part of the research aim (to deduce potential measures to address any area for improvement), as this would suggest that more intensive use would be beneficial given the high importance. Also, comparisons between the distribution of scoring levels for the use of risk factors in credit analysis and in credit monitoring can be compared to judge whether the risk factors are used more prominently in one area compared to another. This would address research objective A5 (To investigate if there is consistency in the view on the importance of risk factors and their use in the credit management process). The analysis of the distribution of the scoring levels across all risk factors supplements this analysis (A5), since intuitively it would be expected that he scoring levels for the importance of the risk factors for default and recovery risk match those relating to the degree to which these factors are used in the credit management process. Also, if aggregated scoring levels for the use of risk factors were higher in credit analysis then in credit monitoring for example, this would indicate that credit monitoring makes less use of the risk factors as a whole.

Ultimately, the relative distribution of scoring levels for the degree to which aspects of portfolio management relating to the risk factors are used in credit analysis and credit monitoring shows whether this is to a greater or a lesser degree. A low degree can indicate that the potential resulting from this is not fully utilised. This addresses research objective A6 (To investigate whether the credit management process is sufficiently integrated and taking advantage of aspects of portfolio management)

The measures of dispersion were included to aid the analysis. For example, a high range can indicate that the views on certain risk factors are controversial.

Research objective A7 (Are there any (additional) weaknesses and areas for improvement present in credit functions' management of LBOs) as well as research objective B were assessed purely qualitatively.

4.1.2 Distribution free Tests

To further back up the analysis derived by the bar charts and the descriptive statistics more statistical analysis was considered advisable. While much of this can be observed from the tables and bar-charts, there was a desire to check if any potential similarities or differences for the rating factors on each dimension would be statistically significant. For example, all participants were asked to rate the importance of each LBO risk factor for the default risk. By way of example, participants were asked how they would rate the importance of financial covenants for the default risk on a scale of 1-5. In the same way, they were asked to rate the importance of leverage for the default risk. So all the factors were rated based on their importance for the default risk using an identical scale. Therefore, it is possible to statistically analyse if there are differences between the scoring levels for the risk factors in total. For example, are financial covenants considered to exert more influence on the default risk than leverage? If the factors were equally important, there would not be any statistically significant difference. This procedure was deemed useful for all the dimensions that were analysed. In terms of a hypothesis, this results in the following:

Scoring levels for the importance of risk factors for default risk:

H_o (DR): There is no difference between the scoring levels assigned to the individual risk factors for their importance for default risk.

H_a (DR): There is a difference in between the scoring levels assigned to the individual risk factors for their importance for default risk.

Scoring levels for the importance of risk factors for recovery risk:

H_o (RR): There is no difference between the scoring levels assigned to the individual risk factors for their importance for recovery risk.

H_a (RR): There is a difference between the scoring levels assigned to the individual risk factors for their importance for recovery risk.

Scoring levels for the use of risk factors in credit analysis:

H_o (CA): There is no difference between the scoring levels assigned to use of individual risk factors in credit analysis.

H_a (CA): There is a difference between the scoring levels assigned to use of individual risk factors in credit analysis.

Scoring levels for the use of risk factors in credit monitoring:

H_o (CM): There is no difference between the scoring levels assigned to use of individual risk factors in credit monitoring

H_a (CM): There is a difference between the scoring levels assigned to use of individual risk factors in credit monitoring

Scoring levels for the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors:

H_o (APFM): There is no difference between the scoring levels assigned to the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors.

H_a (APFM): There is a difference between the scoring levels assigned to the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors.

The analysis mentioned above addresses several research objectives. A2 and A3 are addressed by H_o (DR) / H_a (DR) and by H_o (RR) / H_a (RR). If the alternative hypotheses are confirmed, this suggests that some risk factors are viewed as considerably higher or lower than others. Those receiving higher scoring levels are the most important ones (other than potentially those that were not part of the literature review, but resulted from the open questions in this regard).

Along the same line of argument, A4 is addressed by H_o (CA) / H_a (CA) as well as H_o (CM) / H_a (CM). If the alternative hypothesis is confirmed, some risk factors are likely

to receive more or less attention than others and answers to research objective A4 can be derived. If the null hypothesis can be confirmed, this suggests that the risk factors receive equal attention.

Research objective A5 is partly addressed. As outlined above, the importance of the risk factors and their use in the credit management are different dimensions. While numerically using the same scale, they are measuring different things and the descriptors are different as well, therefore a comparison between the scoring levels has its limitations and thus the analysis of such should predominantly use descriptive statistics. However, if for example it is found that there is consistency in the scoring levels for the importance of risk factors but no consistency in their use in credit analysis or credit management, this at least suggests more divergence of views in the latter and points towards some potentially inconsistent use compared to the importance ascribed to the risk factor. As with the scatter chart comparison, this analysis requires supplementation by qualitative analysis.

Research objective A6 is addressed by H_o (APFM): / H_a (APFM). If the null hypothesis is rejected, this shows there is divergence in the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors. It has been argued that for most risk factors they could and should easily be taken into account. Therefore, if there are differences in relation to this, this suggests that at least for some of the risk factors the use of aspects of portfolio management in credit analysis and credit monitoring can be increased.

As part of the analysis, it was also required to identify any drivers of inconsistencies in scoring levels within one dimension.

The decision to use distribution free tests was driven by the nature of the data. First, it was an ordinal scale, secondly it was related to a small sample and thirdly a normal distribution with values being roughly equally distributed around the mean cannot be assumed from the descriptive statistics. For these circumstances, a series of so-called distribution free tests, also known as non-parametric tests, is available. Generally, these tests use ranking procedures by assigning a rank to the observations. If the data for each of the test variables were similar, then the sum of the ranks would be close to zero.

The data did not stem from a random selection process, which is typically required for hypothesis testing. A counter-argument is that in practice almost all data is derived by some convenience considerations, even if a larger ground sample exists. Ultimately, while there are no doubt shortcomings of the statistical testing of the data, it was still viewed to be beneficial and justifiable for the following reasons:

- The entire research set up was exploratory and indicative. The statistical techniques are only one supporting element in the analysis, whereas at least an equal share of the data was derived from qualitative responses to questions and descriptive statistics.
- While the sample was based on a convenience selection procedure, the background of the participants varied significantly

Tests for multiple comparisons that are typically recommended are the Kruskall-Wallis Test and the Friedman Test. The Friedman Test is recommended for data that is depended. The data in this report was viewed as dependent, since participants were asked to provide scoring levels for various risk factors, i.e. their rating of one factor is likely to influence the rating of another. For the Friedman Test, the level of significance has been chosen at 10%. The results also report the critical value and the computed value for the test statistic, which are referred to as Q-Values within the Friedman Test. The critical value references the value below which the null-hypotheses is accepted at the chosen level of significance. If the computed value is above the critical value, the null-hypothesis is rejected. The p-values are also reported, which show the strength of the rejection or the acceptance of the hypothesis. The smaller the p-value is, the stronger is the support to reject the null hypothesis. As the test shows very low p-values in all instances and therefore provides clear indications for strong rejections, no other levels of significance are shown for the Friedman Test. The term DF in the test statistic references the degrees of freedom. This represents the number of groups that could be varied without influencing the overall result. In this case, each rating factor represents a group of values. The degrees of freedom are calculated as the number of groups minus one.

Finally, it was considered worthwhile to investigate what is driving the rejection of the null hypothesis where it was observed. That is, for example, if the results showed that the scoring levels for the importance of the risk factors are not consistent, if the

inconsistencies in the scoring level were particularly present with view to one or a few risk factors. To compare multiple pairs of data concurrently, a Nemenyi Procedure comparing individual sets of data within the total data group was used. As p-values are not shown for this test, the results are reported at different levels of significance to show their statistical strengths.

The Friedman Test and the Nemenyi-Procedure were carried out with a standard software package, called XLStat. These were created using the describing-data function within the software application.

The procedure for carrying out the distribution free tests was the following: First, raw data was included in Microsoft Excel. Then, XLStat was started. The menu "non-parametric tests" was opened and the choice made to compare two samples or multiple samples respectively. Then the data to be compared was selected and the Friedman Test as well as the Nemenyi Procedure for multiple individual comparisons was chosen. The results were carefully sense-checked by comparison with the frequency distributions shown.

4.1.3 Analysis of Qualitative Data

The interviews were semi-structured, giving some latitude to participants about the areas they wanted to comment on specifically. This and the set-up of the questionnaire resulted in generally quite rich data being generated for the fully open questions in section one, which were all intended to put matters into a broader context and help to improve the validity of the study. Less qualitative data was generated from those questions where participants were also requested to provide a scoring level. However, the length at which interviewees responded to individual questions varied significantly. Most of them provided more information on the questions in the first section of the questionnaire (Appendix 2, p. 154), but some were very short on these and provided more information on the specific questions relating to the individual risk factors, despite these questions predominantly asked for scoring levels to be provided. Following the production of summaries from each interview, responses were carefully checked as to which topic they would mainly touch on or how they could best be categorized. Such categories were derived for each question in the questionnaire and they were constantly

updated during the research process. Based on the first interview, a first set of categories was derived. If in later interviews, additional categories emerged they would be added and sometimes category labels had to be changed during process.

The data generated this manner was kept in a word file for every question. Where a response did fall into a certain category, a count-entry was included in the categories. Where viewed beneficial, comments were added into the field as well such as from quotations. An extract from the file that was used during the research process is included in Appendix 3, p. 169.

Within the responses, some interviewees did mention aspects that fall into more than one category. Therefore, the total frequency by which a category was mentioned is shown in relation to the total number of category mentions. This is shown as "category hits". The number of participants who have mentioned a certain category is also shown in the column "Participants mentioning category". This may exceed 100% or be below 100% when interviewees addressed more than one category in their response or when not all participants answered the questions (mainly the responses to the specific questions on risk-factors, where the focus was on the scoring).

Based on the example of two summaries form the research interviews, the procedure is illustrated with view to question relating to the LBO cycle in Appendix 3, p. 169.

4.1.4 Combining the Results of the Data Analysis

The first step to arrive at the research findings was to shift away from the question-by-question approach that had been applied. This approach was necessary to ensure that all the data is considered, but leads to a silo-type of analysis and it is not capable of providing linkages.

Therefore, in this phase of the study the focus was to interpret the data concurrently with regards to the research objectives. The results of the quantitative analysis relating to each research objective were combined with the data derived from the qualitative analysis.

For each of the research objectives, the results of the data analysis are illustrated and then discussed. Where appropriate, the data from the frequency distribution of response

categories is displayed and sometimes quotes from the participants or extracts from the research summaries were used to amplify certain results

While the research was designed to enhance validity and robustness of results, it was based on a relatively small group of participants. For this purpose, it was considered useful to expose the key findings of the analysis to further experts for a final plausibility check. Therefore, the results were then exposed to four independent senior credit executives and separately to the credit function of one bank. Finally, the overall findings were illustrated using an interdependency-graph, illustrating how the individual findings are likely to influence each other. From this, research objective B was then achieved.

4.2 Research Findings

4.2.1 Results Relating to the Awareness and Importance of the LBO Cycle

The first research objective (A1) is related to whether there was awareness of the LBO cycle and whether its importance is recognised. The literature review highlighted that many of the risk factors appear to be influenced by cyclical moves in the LBO market. Accordingly, if it was recognised as important, the LBO cycle should play an important role in credit analysis and credit monitoring and this could take into account aspects of portfolio management. The LBO cycle was addressed in this research by questions 1.5 and 2.1 in the questionnaire. The results are displayed in the table on the following page.

The majority of the participants thought that an LBO cycle would exist and that they had a clear view of the signals that would indicate an increasingly aggressive LBO cycle. The dominant signals were clear increases in leverage multiples (i.e. suggesting higher debt loads), accompanied by banks' ability to distribute risks to the syndication market. Yet, seven participants mentioned that documentation standards would erode during an increasingly aggressive cycle.

Overview of major interview results regarding the LBO Cycle			
	No. category hits	% category hits	% of interviewees mentioning category
Existence of a cycle:	15.00	20.55%	83.33%
Signals:			
More risks being distributed:	11.00	15.07%	61.11%
Increase in leverage multiples:	11.00	15.07%	61.11%
Increase in purchase prices:	5.00	6.85%	27.78%
Weaker documentation standards:	7.00	9.59%	38.89%
More secondaries/tertiaries:	4.00	5.48%	22.22%
LBO of unsuitable businesses:	2.00	2.74%	11.11%
Credit Management Process:			
Lack of consistent / systematic monitoring at credit function level:	10.00	13.70%	55.56%
Mitigated by other factors:	8.00	10.96%	44.44%
	73.00	100.00%	

Table 4-1: Overview of major interview results regarding the LBO cycle. Source: Author's own.

Some exemplary extracts from the research notes (all from different participants) are illustrated here:

*"…(*the cycle*) is very important, for example as structures get more aggressive and covenants allow more headroom* (-> Weaker documentation standards)*…mechanisms to control risk erode. Credit risk did include evaluation of the chances to redistribute risk – when able to syndicate risk acceptance rises* (-> More risks being distributed)*"*

"…one (author's insertion: signal) *is the development of purchase price multiples. In an upward cycle, you rarely find transactions that are able to de-lever in a no growth scenario…If purchase multiples go up, so does leverage"*

"…Cycle certainly exists, reflected in higher (debt) *multiplies".*

The signals that were mentioned relating to the ability to recognise the point in the LBO cycle is consistent with what the literature review had flagged (Section 2.3.10, p. 39); or Axelson et al., 2010; Acharya et al., 2007; Deutsche Bundesbank, 2007 and 2006; Kaplan and Schoar, 2005; Kaplan and Stein, 1991). These can also be reflected against the categories mentioned in response to question 1.1, which asked participants to describe the experience that banks have had in the LBO market during the last decade and particularly as a result of the financial crisis of 2007/2008 (for full results see Appendix 3). The question was not specifically asking about the LBO cycle, but yet the

most frequently stated categories were the cyclicality in the LBO market as well as a focus on risk distribution.

Overview of major interview results regarding banks' experiences			
	No. category hits	% category hits	% of interviewees mentioning category
Cyclicality in the LBO market:	9.00	29.03%	50.00%
Main focus on the ability to distribute risk:	9.00	29.03%	50.00%
Significant number of defaults:	7.00	22.58%	38.89%
Lack of understanding for the business:	6.00	19.35%	33.33%
	31.00	100%	

Table 4-2: Overview of major interview results regarding banks' experiences. Source: Author's own.

Interestingly, only two participants mentioned that more aggressive markets would also be accompanied by businesses subject to an LBO which are not suitable for this kind of financial structure, i.e. would not show the required stability in their cash flows. This is consistent with the observation made by Axelson et al. (2013) or Brinkhuis and De Maeseneire (2012) who have shown that frequently the capital structure of LBOs cannot be explained by using companies' fundamentals.

"Yes, cycle exists, signs are decreasing covenants (Documentation Standards), *Unsuitable businesses are still used for LBOs* (LBO of unsuitable businesses) *and Higher Multiples* (Leverage)*".*

"Yes, cycle exists, Leverage rises in aggressive markets (Leverage) *and quality of transactions deteriorates (fundamentally and structurally).* Structurally (Weaker documentation Standards), fundamentally (Unsuitable Business).

The surprising element is that this response category was found so infrequently. Regarding the experience that banks have had, there was also a significant mention of rising defaults as well as that more banks entered the market. Sometimes, these new participants were considered to have a lack of understanding for LBOs, but were yet welcome asset takers. The following comment from an interviewee illustrates this:

"Some (authors insertion: smaller asset takers) *thought they understood the business, but in fact they did not and entered this businesses with a rather simple view of the credits, taking large tickets".*

This supports the claim that in such times there is an increasing ability to distribute risks since new players would enter the market seeking participations. Also, there appears to be a strong trend to follow the market because it would take more effort to reject transactions, as several people commented about upward cycles.

The awareness and recognition of the importance of the LBO cycle is also evident in the scoring levels assigned for the importance on default risk and recovery risk which were clearly concentrated in the scoring levels of four and five (Table 4-4, p. 92; Table 4-5, p. 93; Figure 4-1, p. 92 and Figure 4-2, p. 93).

At the same time what is noticeable is that the scoring levels assigned for use in credit management and monitoring are skewed towards the middle point of the scoring scale. This means that they are only taken into account to some degree and also the utilization of portfolio management aspects with regards to the LBO cycle remains moderate (p. 106).

This is somewhat surprising, since the signals for the LBO market that participants have mentioned can easily be observed but would clearly require that developments within the portfolio would need to be reflected and that credit analysis and credit monitoring would feed such information to portfolio management and vice versa. Elaborating on the inclusion of the LBO cycle as part of the credit management process, a frequently found statement was that there would be no systematic consideration of this and that the LBO cycle would typically be mitigated by other factors. What this was supposed to describe was that while one is aware of the LBO cycle, a decision about each transaction would be made according to its own features and the LBO cycle would not play an important role in this regard. One participant's comment in this regard was:

"The point in the LBO cycle is not a sufficient reason to decline a transaction." (->Lack of systematic consideration)

"This requires anticipation of certain aspects over time (author's insertion: regarding the wider market) *and is not done* (author's insertion: At the level of the individual transaction). *No portfolio-aspect is taking place with view to timing* (author's insertion: relating to vintage year's of LBOs).

"The cycle reflects macro-developments and as such has no influence on the risk. What is important is the business model. There is no focus on the development of the cycle".

What this suggests is that there is a belief in one's own ability to consistently choose those transactions that would be better from a credit risk viewpoint than the majority of the aggressive cycle, as for example indicated by the last quote above. The evidence, however, suggests that many people thought they had this ability but were not proved to be correct when looking at the high number of transactions that required some form of restructuring (e.g. PWC, 2010). This is further supported by the answer received to the question about what banks could do better. Here a total of 20 responses were classified, of which 45% of participants mentioned that a more independent, long-term view regarding LBO credits would be a way to improve LBO credit risk management. This suggests that much of the activity of the boom that lasted until about 2007 was driven by cyclical momentum and not much attention was paid to this.

Summary of research findings relating to the awareness and importance of the LBO cycle:

- There is an awareness of the existence of the LBO cycle and its relevance for the credit risk. Most of the risk factors that were tested were mentioned initially.
- Despite its importance, the LBO cycle only receives moderate attention in the credit management process and is largely driven by the view that one can choose those transactions that show more acceptable risk profiles even in aggressive LBO markets.
- There appears to be no systematic monitoring of the LBO cycle based on easily observable factors (see above).
- It appears to be recognised that during the last peak cycle and the period leading to this, there was some "follow-the-crowd behaviour".

4.2.2 Results Relating to the Awareness and Importance of Risk Factors

The results presented in this sub-section address two of the research objectives:

- Research objective A2 (To investigate which risk factors – other than the LBO cycle - are viewed as the most important ones in credit functions' assessment of LBOs' credit risk).

- Research objective A3 (To analyse how the risk factors identified in the literature review are judged in terms of importance for the credit risk).

These objectives were mainly addressed by question 1.2 and the questions asking participants to assign a scoring level for the importance of the individual risk factors. Questions 1.1 and 3.0 did serve to highlight potential additional risk factors that may have emerged but which were not yet covered in the literature. Questions 2.1 – 2.10 were designed to see how the importance of those risk factors found in the literature were judged in terms of their importance for credit risk. By combining the results related to these two questions it is also possible to check their consistency.

Overview of major interview results regarding main risk factors			
	No. category hits	% category hits	% of interviewees mentioning category
Issues within the business fundamentals:	13.00	27.66%	72.22%
Leverage:	11.00	23.40%	61.11%
Industry state:	8.00	17.02%	44.44%
Deal structure:	5.00	10.64%	27.78%
Specifically for Recovery Risk			
Collateral:	3.00	6.38%	16.67%
Industry state:	3.00	6.38%	16.67%
Deal structure:	2.00	4.26%	11.11%
Jurisdiction:	2.00	4.26%	11.11%
	47.00	100.00%	

Table 4-3: Overview of major interview results regarding main risk factors. Source: Author's own.

Exemplary extracts from the research notes:

"…little attention has been given to debt capacity" (author's insertion: based on the company's business model -> issues with business fundamentals).

"Strong cash-flow volatility" ->(issues with business fundamentals), *also relating to industry factors* (-> industry state).

"Secular industry changes are important…and the evaluation of the business model".

"Leverage, structure and the market position of the company".

The most frequently mentioned aspect during the interviews was issues with the fundamentals of a business, with little differentiation between default risk and recovery risk. This was interesting for two reasons. One is that this is likely to be of high relevance, also in non-LBO credits. Arguably, this might be the case for other risk factors pointed out as a result of the literature review as well. However, it is being argued that these issues are at least particularly relevant in LBOs, since they operate under significant debt burdens and therefore have a higher risk of default per se, which also increases the necessity to consider recovery risk. Secondly, at least parts of the literature as well as the experience of the years 2006-2007 indicate that business fundamentals were not adequately considered in terms of the structuring of LBOs (see above). Therefore, the strong focus on business fundamentals either presents an illusion that they are a driver of the capital structure or a belief in one's own ability to choose those transactions where the capital structure is actually consistent with the business fundamentals.

One participant commented on this as follows:

"we believe to be able to make forecasts, which we are of course. However, there is a natural tendency to think in linear relationships and not enough consideration is given to secular changes that may take place."

The comment highlights that there appears to be an overestimation of one's own ability and that systematic factors experience little consideration. This is supported by the relatively few people that mentioned that in an upward cycle there would be more businesses being subject to an LBO which are not suitable for this kind of financing (see Section 4.2.1; p. 84) and also a claim being made regarding mitigating the LBO cycle by individual transaction characteristics.

Eleven participants mentioned leverage as a prime risk driver, which is consistent with the literature (Section 2.3.3, p. 30). Interestingly, industry state was also amongst the factors that were frequently mentioned. The literature review only discussed this with regards to recovery risk, but the participants also stated it would also be a driver of default risk. This aspect was not considered in the literature review of this study, as it was deemed to be widely applicable to any credit exposure. However, there is some

validity in the argument, as for example the definitions of LBOs in the literature frequently make references to stable cash flows as a requirement. The factor is interpreted to be largely overlapping with business fundamentals, which was confirmed during the interviews.

In total, six of the ten risk factors identified in the literature review were mentioned explicitly. As seen in the previous sub section, the LBO cycle was also recognised to be present and viewed of high importance for default risk and recovery risk, therefore at least as far as importance of risk factors is concerned there is consistency amongst those mentioned and those found in the literature.

Another interesting observation from the data is that the risk factors were rarely directly related to recovery risk. Even collateral, the most obvious and least contested driver of recovery risk (see Section 2.3.7, p.37) was only mentioned three times. This was commented on by one participant by explaining that recovery risk would only come into play when default has materialised or was about to materialise and this was not a valid assumption in credit analysis. If that was the view, the transaction would be declined initially. An entry following a comment form a participant in the research notes illustrates this:

"Recovery Risk is clearly under-represented in credit analysis and monitoring; not the domain of classical credit functions (not used to perform this kind of analysis)."

No risk factors in addition to those found in the literature were recorded other than those already discussed (i.e. management). This suggests that there was no emergence of new risk factors in the cycle that ended in 2007.

Importance of risk factors for default risk							
	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Totals
Number of Data Points	18.00	18.00	18.00	18.00	18.00	18.00	108.00
Frequency Distribution							
Scoring 5	10.00	5.00	7.00	16.00	4.00	6.00	48.00
Scoring 4	3.00	10.00	8.00	2.00	9.00	8.00	40.00
Scoring 3	5.00	3.00	1.00	0.00	5.00	0.00	14.00
Scoring 2	0.00	0.00	1.00	0.00	0.00	4.00	5.00
Scoring 1	0.00	0.00	1.00	0.00	0.00	0.00	1.00
Measures of Location / Dispersion							
Highest rating	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Lowest rating	3.00	3.00	1.00	4.00	3.00	2.00	1.00
Range	2.00	2.00	4.00	1.00	2.00	3.00	4.00
Arithmetic mean	4.28	4.11	4.06	4.89	3.94	3.89	4.19
Median	5.00	4.00	4.00	5.00	4.00	4.00	4.00
Mode	5.00	4.00	4.00	5.00	4.00	4.00	5.00

Table 4-4: Importance of risk factors for default risk. Source: Author's own.

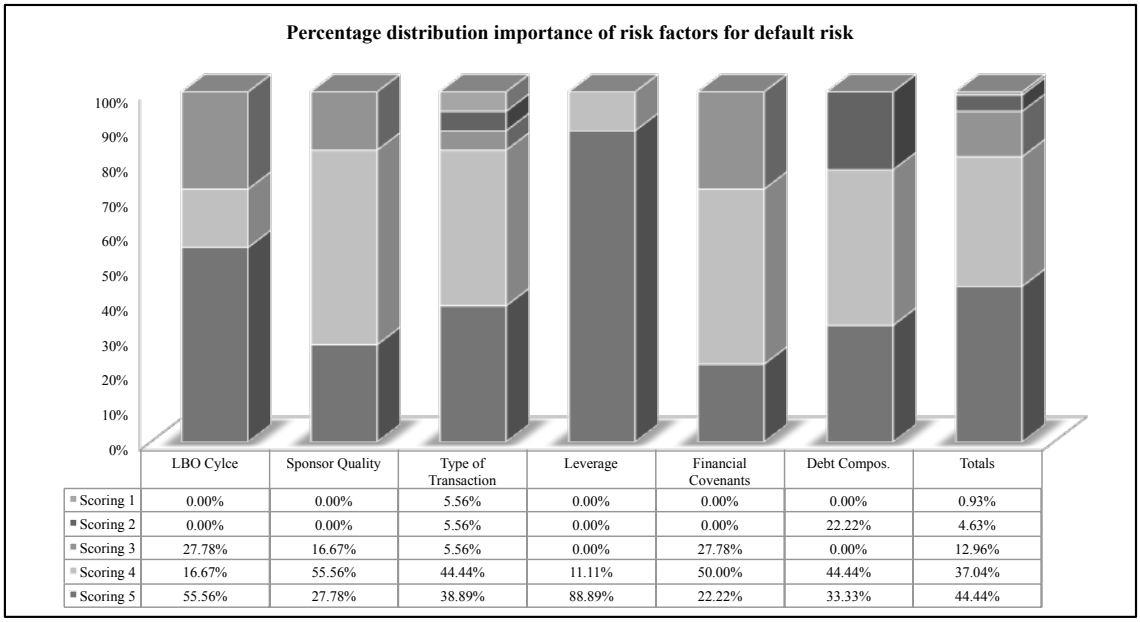
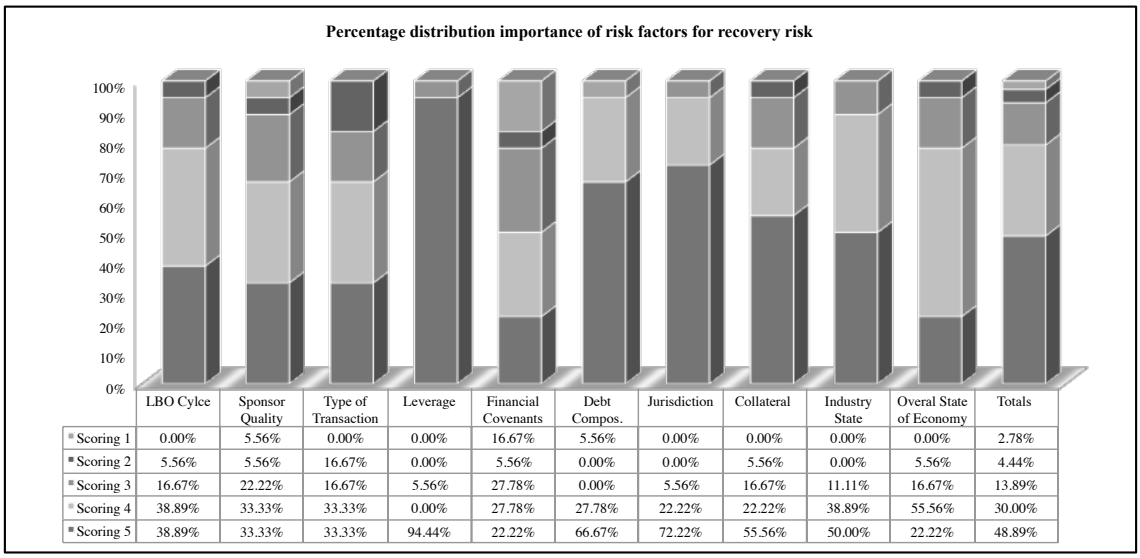


Figure 4-1: Percentage distribution importance of risk factors for default risk. Source: Author's own.

Importance of risk factors for recovery risk											
	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Number of Data Points	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	180.00
Frequency Distribution											
Scoring 5	7.00	6.00	6.00	17.00	4.00	12.00	13.00	10.00	9.00	4.00	88.00
Scoring 4	7.00	6.00	6.00	0.00	5.00	5.00	4.00	4.00	7.00	10.00	54.00
Scoring 3	3.00	4.00	3.00	1.00	5.00	0.00	1.00	3.00	2.00	3.00	25.00
Scoring 2	1.00	1.00	3.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	8.00
Scoring 1	0.00	1.00	0.00	0.00	3.00	1.00	0.00	0.00	0.00	0.00	5.00
Measures of Location / Dispersion											
Max.	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Min.	2.00	1.00	2.00	3.00	1.00	1.00	3.00	2.00	3.00	2.00	1.00
Range	3.00	4.00	3.00	2.00	4.00	4.00	2.00	3.00	2.00	3.00	4.00
Arithmetic mean	4.11	3.83	3.83	4.89	3.33	4.50	4.67	4.28	4.39	3.94	4.18
Median	4.00	4.00	4.00	5.00	3.50	5.00	5.00	5.00	4.50	4.00	4.00
Mode	4.00	4.00	4.00	5.00	4.00	5.00	5.00	5.00	5.00	4.00	5.00

Table 4-5: Importance of risk factors for recovery risk. Source: Author's own.



	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Scoring 1	0.00%	5.56%	0.00%	0.00%	16.67%	5.56%	0.00%	0.00%	0.00%	0.00%	2.78%
Scoring 2	5.56%	5.56%	16.67%	0.00%	5.56%	0.00%	0.00%	5.56%	0.00%	5.56%	4.44%
Scoring 3	16.67%	22.22%	16.67%	5.56%	27.78%	0.00%	5.56%	16.67%	11.11%	16.67%	13.89%
Scoring 4	38.89%	33.33%	33.33%	0.00%	27.78%	27.78%	22.22%	22.22%	38.89%	55.56%	30.00%
Scoring 5	38.89%	33.33%	33.33%	94.44%	22.22%	66.67%	72.22%	55.56%	50.00%	22.22%	48.89%

Figure 4-2: Percentage distribution importance of risk factors for recovery risk. Source: Author's own.

What becomes evident when looking at the charts above is that overall the majority of the risk factors are viewed to be of high or very high importance (rated four or five) for both the risk of default and the recovery risk. This is consistent with most of them being initially mentioned during the open questions. A total of 81% of all the scoring levels assigned were at a level of four or five for default risk and this was also the case for 79% of all ratings assigned for recovery risk.

Looking at the individual risk factors first gives the impression that the scoring levels for recovery risk are more dispersed. However, there were more scoring levels to be assigned for the importance of risk factors on recovery risk than there were for the

importance of default risk. In total, ten factors were evaluated with regards to recovery risk, but only six in terms of default risk.

The Friedman Test for testing whether there is consistency in the scoring levels first rejected this for both the default risk and the recovery risk since the critical values had been exceeded. The low p-values also indicate a very strong case for rejection.

Friedman Test importance of risk factors for default risk	
Q (Observed value)	21.477
Q (Critical value)	9.236
DF	5
p-value (two-tailed)	0.001
alpha (Level of significance)	0.1

Table 4-6: Friedman Test importance of risk factors for default risk. Source: Author's own (using XLSTAT)

Friedman Test importance of risk factors for recovery risk	
Q (Observed value)	41.837
Q (Critical value)	14.684
DF	9
p-value (two-tailed)	<0.0001
alpha (Level of significance)	0.1

Table 4-7: Friedman Test importance of risk factors for recovery risk. Source: Author's own (using XLSTAT)

The statistical representation of these results is:

H_o (DR): There is no difference between the scoring levels assigned to the individual risk factors for their importance for default risk. -> **Rejected.**

H_a (DR): There is a difference in between the scoring levels assigned to the individual risk factors for their importance for default risk. -> **Accepted.**

H_o (RR): There is no difference between the scoring levels assigned to the individual risk factors for their importance for recovery risk. -> **Rejected.**

H_a (RR): There is a difference between the scoring levels assigned to the individual risk factors for their importance for recovery risk. -> **Accepted.**

Significant differences based on a Friedman Test and a Nemenyi Procedure (default risk)									
	LBO Cycle	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Composition	Jurisdiction	Collateral	Industry State
LBO Cycle	No								
Sponsor Quality	No								
Type of Transaction	No	No							
Leverage	No	**Yes***	No						
Financial Covenants	No	No	No	**Yes*****					
Debt Composition	No	No	No	**Yes****	No				
Jurisdiction									
Collateral									
Industry State									
Overall State Economy									

*Table 4-8: Significant differences based on a Friedman Test and a Nemenyi Procedure (default risk). Levels of significance: *at 10%; **at 5%, ***at 1%. Source: Author's own (using XLSTAT).*

Significant differences based on a Friedman Test and a Nemenyi Procedure (recovery risk)									
	LBO Cycle	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Composition	Jurisdiction	Collateral	Industry State
LBO Cycle									
Sponsor Quality	No								
Type of Transaction	No	No							
Leverage	No	**Yes****	**Yes***						
Financial Covenants	No	No	No	**Yes*****					
Debt Composition	No	No	No	No	**Yes***				
Jurisdiction	No	No	No	No	**Yes**	No			
Collateral	No	No	No	No	No	No	No		
Industry State	No	No	No	No	No	No	No	No	
Overall State Economy	No	No	No	**Yes****	No	No	No	No	No

*Table 4-9: Significant differences based on a Friedman Test and a Nemenyi Procedure (recovery risk). Levels of significance: *at 10%; **at 5%, ***at 1%. Source: Author's own (using XLSTAT).*

For the scoring levels assigned to the importance of risk factors for default risk, this is clearly driven by leverage, which is consistently rated at the high end of the scale. A test where leverage was excluded from the distribution (not shown) actually led to acceptance of the hypothesis.

Regarding the importance for recovery risk, the picture is more diffused. Regarding leverage, the same explanation applies as that provided for the comparison of the scoring levels for the importance of default risk. The second risk factor that appeared to have received scoring levels that are different from the rest is financial covenants, which received relatively low scoring levels. Participants explained that this would be based on covenants no longer providing any protection once a default has occurred. It was recognised that financial covenants would provide a strong point for negotiations, but

some people elaborated that they would have to be exercised prior to a default occurring:

"Technically, covenants influence default risk, this is how they are structured. However, they are set far before payment default occurs. In practice, there is no focus (author's insertion: with view to covenants) *on recovery risk."*

"...(author's insertion: influence) *high because it educates management to exercise discipline. No influence on recovery levels."*

"...Recovery risk: Some importance, also recovery risk only comes when default has occurred"

"Covenants serve as a warning signal, but are unlikely to cause a real (author's insertion: payment default)*…also, for recovery risk this is not viewed to have an impact. Once a transaction is in default so that recovery plays a role, all covenants are in breach anyway."*

Summary of research findings relating to the awareness and importance of risk factors:

Overall, the research findings relating research objectives A2 and A3 can be summarised as follows:

- The initial mentioning of six (seven including the LBO cycle) of the risk factors that the literature review has flagged points to a solid level of awareness.
- Albeit the risk factors are viewed as very important for recovery risk, few instances were recorded where the risk factors were specifically related to recovery risk with regards to the open questions. This indicates that recovery risk may not be the main concern for credit analysts.
- There were no additional risk factors mentioned other than business fundamentals. It was argued that this is equally relevant for any kind of credit risk and that in particular in LBOs, there is a higher risk that the capital structure will not match the business fundamentals. A similar observation was made for industry state.

- The high levels assigned for each of the risk factors regarding their importance for default risk and recovery risk states that most of them are viewed as important drivers of LBO credit risk. Differences exist in the evaluation as to how important individual risk factors are for default risk and recovery risk. The statistical procedure testing the consistency between the scoring levels assigned led to a rejection of the null hypothesis. This rejection was based on the scoring levels of a few individual risk factors. Taking this into account, the scoring levels for the importance of risk factors are viewed very consistently regarding default risk. However, for recovery risk the picture is more differentiated as in particular financial covenants are not considered to have a strong impact.

4.2.3 Results Relating to the Use of Risk Factors in Credit Analysis and Credit Monitoring

The analysis so far indicated that knowing where the risks are was well established, despite the fact that recovery risk may not be at the forefront of participants' minds. The presence of the LBO cycle and its relevance has also been confirmed. Consequently, what had to be addressed next was the question of which factors, if any, are used in the credit management process and to what degree.

This relates to the following research objectives:

- **Research objective A4:** To investigate the risk factors' credit functions mainly focusing on assessing LBOs.
- **Research objective A5:** To investigate if there is consistency in the view on the importance of risk factors and their use in the credit management process.

These research objectives were addressed by questions 1.3 in comparison to questions 1.1 and 1.2 and the scoring levels were requested as part of questions 2.1 – 2.10 for each of the risk factors. The table below shows the distribution of the categories found as part of the open question.

Overview of major interview results regarding the main risk factors used in CA / CM			
	No. category hits	% category hits	% of interviewees mentioning category
Business fundamentals:	13.00	30.23%	72.22%
Leverage:	10.00	23.26%	55.56%
Industry state:	8.00	18.60%	44.44%
Performance against plan / historical performance:	5.00	11.63%	27.78%
Deal structure:	4.00	9.30%	22.22%
Specifically on Recovery Risk:			
Sponsor:	2.00	4.65%	11.11%
Collateral:	1.00	2.33%	5.56%
	43.00	100.00%	

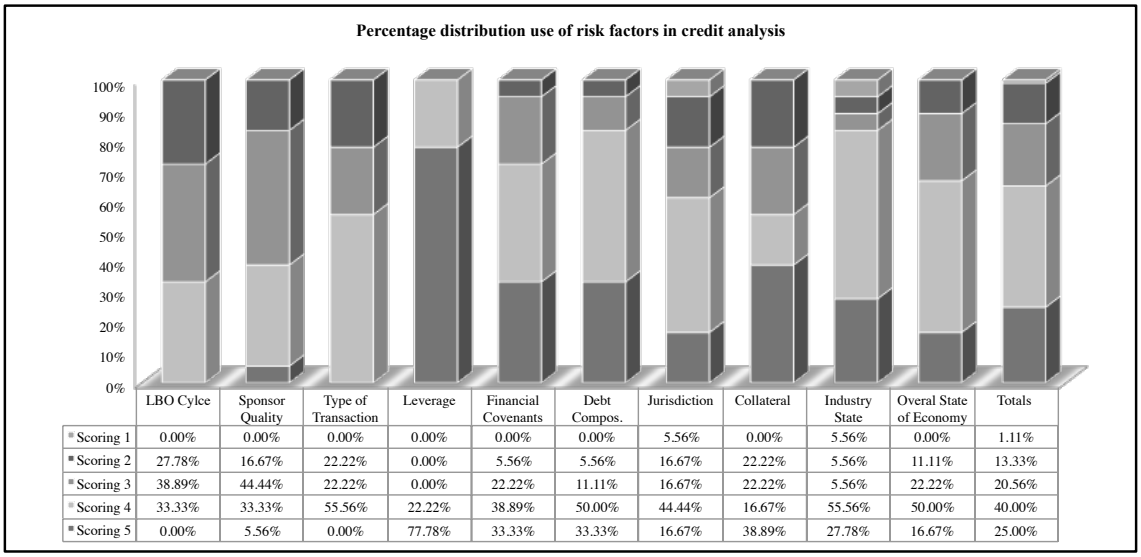
Table 4-10: Overview of major interview results regarding the main risk factors used in CA/CM. Source: Author's own.

The results generated from open question 1.3 for this research objective show very high consistency with those relating to the most important risk factors. An aspect newly introduced in the general part was the comparison of an LBO company's performance against historical data and the business plan. What is also consistent is that there are few references to recovery risk as such, with two participants mentioning sponsor quality as a factor that receives significant attention in credit analysis and credit monitoring with regards to assessing recovery risk. Also, only one person identified collateral as a risk driver, which again supports the lower attention given to recovery risk. The significant mention of business fundamentals supports what was stated earlier, that there is a view that credit functions are able to evaluate whether the business fundamentals match the capital structure.

For each of the risk factors, participants were also asked to assign a scoring level regarding the degree to which they thought the respective factor would be used within credit analysis and credit monitoring.

Use of risk factors in credit analysis											
	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Number of Data Points	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	180.00
Frequency Distribution											
Scoring 5	0.00	1.00	0.00	14.00	6.00	6.00	3.00	7.00	5.00	3.00	45.00
Scoring 4	6.00	6.00	10.00	4.00	7.00	9.00	8.00	3.00	10.00	9.00	72.00
Scoring 3	7.00	8.00	4.00	0.00	4.00	2.00	3.00	4.00	1.00	4.00	37.00
Scoring 2	5.00	3.00	4.00	0.00	1.00	1.00	3.00	4.00	1.00	2.00	24.00
Scoring 1	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	2.00
Measures of Location / Dispersion											
Max.	4.00	5.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Min.	2.00	2.00	2.00	4.00	2.00	2.00	1.00	2.00	1.00	2.00	1.00
Range	2.00	3.00	2.00	1.00	3.00	3.00	4.00	3.00	4.00	3.00	4.00
Arithmetic mean	3.06	3.28	3.33	4.78	4.00	4.11	3.50	3.72	3.94	3.72	3.74
Median	3.00	3.00	4.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Mode	3.00	3.00	4.00	5.00	4.00	4.00	4.00	5.00	4.00	4.00	4.00

Table 4-11: Use of risk factors in credit analysis. Source: Author's own.

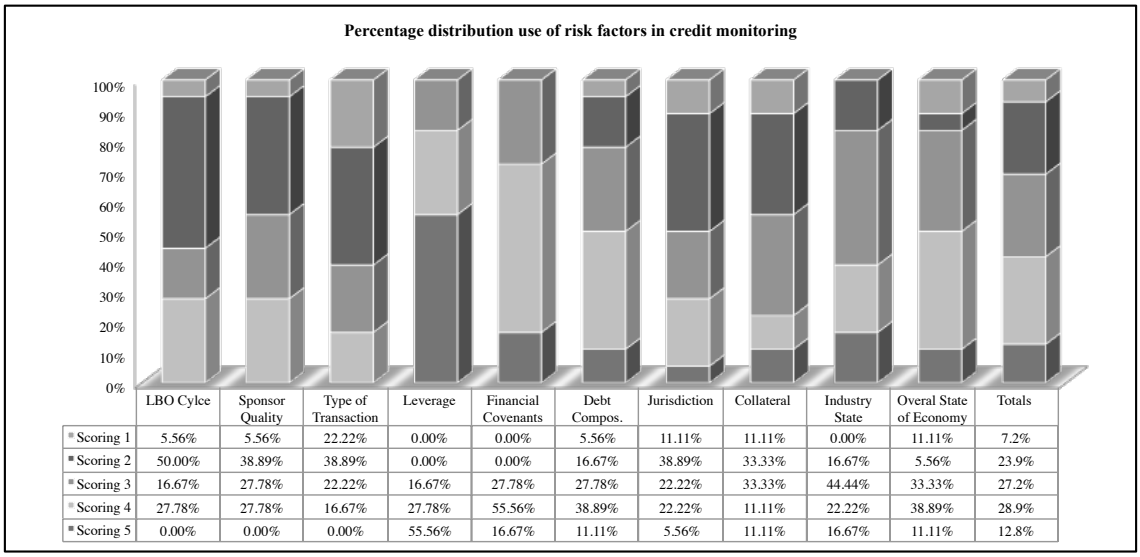


	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Scoring 1	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.56%	0.00%	5.56%	0.00%	1.11%
Scoring 2	27.78%	16.67%	22.22%	0.00%	5.56%	5.56%	16.67%	22.22%	5.56%	11.11%	13.33%
Scoring 3	38.89%	44.44%	22.22%	0.00%	22.22%	11.11%	16.67%	22.22%	5.56%	22.22%	20.56%
Scoring 4	33.33%	33.33%	55.56%	22.22%	38.89%	50.00%	44.44%	16.67%	55.56%	50.00%	40.00%
Scoring 5	0.00%	5.56%	0.00%	77.78%	33.33%	33.33%	16.67%	38.89%	27.78%	16.67%	25.00%

Figure 4-3: Percentage distribution use of risk factors in credit analysis. Source: Author's own.

Use of risk factors in credit monitoring											
	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Number of Data Points	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	180.00
Frequency Distribution											
Scoring 5	0.00	0.00	0.00	10.00	3.00	2.00	1.00	2.00	3.00	2.00	23.00
Scoring 4	5.00	5.00	3.00	5.00	10.00	7.00	4.00	2.00	4.00	7.00	52.00
Scoring 3	3.00	5.00	4.00	3.00	5.00	5.00	4.00	6.00	8.00	6.00	49.00
Scoring 2	9.00	7.00	7.00	0.00	0.00	3.00	7.00	6.00	3.00	1.00	43.00
Scoring 1	1.00	1.00	4.00	0.00	0.00	1.00	2.00	2.00	0.00	2.00	13.00
Measures of Location / Dispersion											
Max.	4.00	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Min.	1.00	1.00	1.00	3.00	3.00	1.00	1.00	1.00	2.00	1.00	1.00
Range	3.00	3.00	3.00	2.00	2.00	4.00	4.00	4.00	3.00	4.00	4.00
Arithmetic mean	2.67	2.78	2.33	4.39	3.89	3.33	2.72	2.78	3.39	3.33	3.16
Median	2.00	3.00	2.00	5.00	4.00	3.50	2.50	3.00	3.00	3.50	3.00
Mode	2.00	2.00	2.00	5.00	4.00	4.00	2.00	2.00	3.00	4.00	3.00

Table 4-12: Use of risk factors in credit monitoring. Source: Author's own.



	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Scoring 1	5.56%	5.56%	22.22%	0.00%	0.00%	5.56%	11.11%	11.11%	0.00%	11.11%	7.2%
Scoring 2	50.00%	38.89%	38.89%	0.00%	0.00%	16.67%	38.89%	33.33%	16.67%	5.56%	23.9%
Scoring 3	16.67%	27.78%	22.22%	16.67%	27.78%	27.78%	22.22%	33.33%	44.44%	33.33%	27.2%
Scoring 4	27.78%	27.78%	16.67%	27.78%	55.56%	38.89%	22.22%	11.11%	22.22%	38.89%	28.9%
Scoring 5	0.00%	0.00%	0.00%	55.56%	16.67%	11.11%	5.56%	11.11%	16.67%	11.11%	12.8%

Figure 4-4: Percentage distribution use of risk factors in credit monitoring. Source: Author's own.

For credit analysis and credit monitoring the range of the five point scale is utilised more diversely than is the case for the scoring levels assigned for the importance of risk factors, where a heavy concentration was present in the scoring levels of four and five. For credit analysis, only 62% of all scoring levels assigned across the various risk factors received a scoring level of four or five for the degree to which they are considered in credit analysis. In credit monitoring, this is only the case for 42% of all scoring levels assigned, and here half of responses saw the degree to which the risk factors were used at scoring levels two or three. What the data shows is that the utilization of risk factors is not as significant in credit monitoring as it is in credit analysis. Also, despite the different matters measured (importance vs. use), the data at least hints that the degree to which risk factors are used in credit analysis and credit monitoring does not correspond to their importance for the default and the recovery risk. This is based on the assumption that given the high importance seen for the risk factors for credit risk, one would expect them to be considered to a high degree in total. The qualitative responses relating to the LBO cycle support this further. As the charts show, the LBO cycle is rated relatively low in terms of its use in credit analysis and credit monitoring compared to the other factors.

"The cycle is only noted when it happens (author's comment: the overheating and subsequent rise in default). *This would make a lot of sense, but requires continuous monitoring of the cycle and requires to take advantage of experience."*

Another participant in the interviews explained that the cycle would be an important risk factor, but it was mainly taken into account with view to the ability to redistribute risks. It was explained that once syndication abilities are present, the tolerance level for risk rises. This actually confirms that an increased ability to redistribute risks is also a signal for an increasingly aggressive market and that this may lead to a reduction in independent analytical efforts.

The wider diffusion of scoring levels is supported by the distribution free tests that were conducted. The Friedman Test for the use of risk factors in credit analysis and in credit monitoring rejected the hypothesis that the scoring levels are the same. Reverting back to the data analysis section, the results can be summarised as follows:

Friedman Test use of risk factors in credit analysis	
Q (Observed value)	49.602
Q (Critical value)	14.684
DF	9
p-value (two-tailed)	<0.0001
alpha (Level of significance)	0.1

Table 4-13: Friedman Test use of risk factors in credit analysis. Source: Author's own (using XLSTAT)

Friedman Test use of risk factors in credit monitoring	
Q (Observed value)	61.796
Q (Critical value)	14.684
DF	9
p-value (two-tailed)	<0.0001
alpha (Level of significance)	0.1

Table 4-14: Friedman Test use of risk factors in credit monitoring. Source: Author's own (using XLSTAT)

Scoring levels for the use of risk factors in credit analysis:

H_o (CA): There is no difference between the scoring levels assigned to use of individual risk factors in credit analysis. **-> Rejected.**

H_a (CA): There is a difference between the scoring levels assigned to use of individual risk factors in credit analysis. **-> Accepted.**

H_o (CM): There is no difference between the scoring levels assigned to use of individual risk factors in credit monitoring. **-> Rejected.**

H_a (CM): There is a difference between the scoring levels assigned to use of individual risk factors in credit monitoring. **-> Accepted**

Significant differences based on a Friedman Test and a Nemenyi Procedure (credit analysis)									
	LBO Cycle	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Composition	Jurisdiction	Collateral	Industry State
LBO Cycle									
Sponsor Quality	No								
Type of Transaction	No	No							
Leverage	**Yes*****	**Yes*****	**Yes*****						
Financial Covenants	No	No	No	No					
Debt Composition	**Yes****	No	No	No	No				
Jurisdiction	No	No	No	**Yes*****	No	No			
Collateral	No	No	No	**Yes***	No	No	No		
Industry State	No	No	No	No	No	No	No	No	
Overall State of Economy	No	No	No	**Yes****	No	No	No	No	No

*Table 4-15: Significant differences based on a Friedman Test and a Nemenyi procedure (credit analysis). Levels of significance: *at 10%; **at 5%, ***at 1%. Source: Author's own (using XLSTAT).*

Significant differences based on a Friedman Test and a Nemenyi Procedure (credit monitoring)									
	LBO Cycle	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Composition	Jurisdiction	Collateral	Industry State
LBO Cycle									
Sponsor Quality	No								
Type of Transaction	No	No							
Leverage	**Yes*****	**Yes*****	**Yes*****						
Financial Covenants	**Yes***	**Yes***	**Yes*****	No					
Debt Composition	No	No	No	No	No				
Jurisdiction	No	No	No	**Yes*****	**Yes****	No			
Collateral	No	No	No	**Yes*****	**Yes***	No	No		
Industry State	No	**No**	No	No	No	No	No	No	
Overall State of Economy	No	No	No	No	No	No	No	No	No

*Table 4-16: Significant differences based on a Friedman Test and a Nemenyi procedure (credit monitoring). Levels of significance: *at 10%; **at 5%, ***at 1%. Source: Author's own (using XLSTAT).*

Table 4-15 and Table 4-16 illustrate where the major differences between the risk factors lie. For credit analysis and credit monitoring, both of them involve leverage, which is driven by the particularly high scoring levels that leverage receives in both credit analysis and credit monitoring. Other than this, for credit analysis, those comparisons that show most discrepancies are the LBO cycle and sponsor quality and type of transaction.

For credit monitoring, the most frequent counts of inconsistency other than those involving leverage was found in financial covenants.

The relatively low consideration given to the LBO cycle has already been discussed. Discrepancies relating to sponsor quality are worth investigating in more detail. This specific factor appeared to be particularly relevant with regards to recovery risk. In terms of what was important about sponsor quality, seven participants did mention that

it was the track record of the sponsor, but in five cases this was directly linked to the ability to provide additional funds when needed, i.e. when financial distress occurs. For credit monitoring, there was a view that at this stage it is too late to be concerned about the sponsor, since it can no longer be changed. However, four participants suggested that an area of improvement would be some systematic approach based on common criteria. Debt composition was also geared significantly to the higher end of the scoring scale in credit analysis, so the effect is the same as for the comparison with leverage. The main reason stated for why it is receiving so much attention is that there are likely to be conflicting views from different lender groups. This supports the importance of debt composition for default risk and recovery risk, as outlined in the literature review (Section 2.3.5, p. 34) by inferring from Demiroglu (2008), Halpern et al. (2008) and Deutsche Bundesbank (2007). It was argued in the literature review that particularly complex financing structures could increase the probability of default and lower recovery prospects.

On credit monitoring, the type of transaction receives very little attention. Looking at the response categories for this risk factor and the elaboration pertaining to this factor, 10% of the responses fell into the categories that the type of transaction would not be a decisive factor in credit analysis and credit monitoring. Moreover, it was explained by four participants that in credit monitoring it would be too late to worry about what type of transaction one is facing. Three entries from different participants into the research notes are illustrative of this:

"Secondary transactions are much more aggressively structured….Very limited attention given in analysis and monitoring…however would make sense…

This (author's comment: the more aggressive structures) *has been recognised now and for some time, this is an exclusion criteria…but only applicable in credit analysis.*

Sometimes banks say that they have had poor experience (author's insertion: with secondary/recap transactions")*….therefore business case validation is an important aspect but is a binary decision.*

Similar responses were received in relation to jurisdiction, collateral, industry state and overall state of the economy. For jurisdiction, it was explained that this is typically a

"YES" or "NO" decision and once made, it cannot be altered. Two statements from interviewees illustrate this:

"In monitoring (author's insertion: Jurisdiction) *is only considered when things go worse".*

"No importance at all in credit monitoring. Once in a deal, cannot change it".

Similar arguments were found for industry state, which for this reason came out at a median of four for its degree of use in credit analysis and only three for credit monitoring. Collateral was neither at the forefront of analysis nor of monitoring and the overall state of the economy was only considered to some degree in credit monitoring. All these latter factors were only evaluated with regards to recovery risk for the reasons explained earlier.

This low level of attention paid to some risk factors in credit monitoring has obvious consequences for aspects of portfolio management. For portfolio management to provide useful data to credit analysis and credit monitoring, this would have to be constantly updated. Being asked about whether the portfolio was clustered according to some covenant measure, one participant commented:

"I do not think anyone is doing this; covenants are just checked for their presence and compliance". On a subsequent question whether this could be achieved easily the response was a clear "yes".

Summary of research findings relating to the use of risk factors in credit analysis and credit monitoring:

- Overall, there is high consistency between those risk factors viewed as important and those considered in credit analysis and in credit monitoring.
- Within credit analysis and credit monitoring, the degree to which risk factors are considered varies significantly.
- Risk factors viewed to be particularly relevant for recovery risk are used to a lower degree than those viewed to be relevant for default risk and recovery risk.
- The degree to which the risk factors are used is higher in credit analysis than in credit monitoring.

- Within credit monitoring, the moderate degree of is frequently explained by there no longer being a chance to alter the state once a transaction has been entered into. This is the case for sponsor quality, jurisdiction, collateral and type of transaction.

4.2.4 Results Relating to the Use of Aspects of Portfolio Management

Results in this section relate to the following research objective:

- **Research objective A6:** To investigate whether credit monitoring and credit analysis take advantage of aspects of portfolio management.

This research objective was addressed by the various questions indirectly and by directly asking for the scoring scale of the use of aspects of portfolio management with regards to the risk factors as well as question 3.0, which asked whether overall LBOs would be viewed within a wider portfolio.

Are LBO credits assessed with regards to the characteristics of a wider portfolio?		
	Participants	%
Yes:	10.00	55.56%
No:	6.00	33.33%
No view:	2.00	11.11%
	18.00	100.00%

Table 4-17: Are LBO credits assessed with regards to the characteristics of a wider portfolio?. Source: Author's own.

The intuitive thinking was that a single transaction would be viewed within a portfolio context, yet six participants thought that this was not the case and two had no specific view on this. This provided a first data point suggesting that there may not be full integration with portfolio management.

The next step was to investigate the detailed distribution of the scoring levels with regards to the risk factors and in aggregate, in the same manner as was done for the other dimensions.

Degree of use of aspects of portfolio management in credit analysis/credit monitoring with view to risk factors											
	LBO Cylce	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Compos.	Jurisdiction	Collateral	Industry State	Overal State of Economy	Totals
Number of Data Points	18.00	17.00	18.00	18.00	16.00	18.00	18.00	18.00	17.00	16.00	174.00
Frequency Distribution											
Scoring 5	1.00	0.00	0.00	8.00	0.00	3.00	4.00	1.00	4.00	2.00	23.00
Scoring 4	2.00	2.00	4.00	7.00	6.00	10.00	3.00	1.00	8.00	6.00	49.00
Scoring 3	11.00	6.00	4.00	3.00	7.00	3.00	3.00	9.00	4.00	4.00	54.00
Scoring 2	4.00	6.00	7.00	0.00	2.00	2.00	5.00	4.00	1.00	2.00	33.00
Scoring 1	0.00	3.00	3.00	0.00	1.00	0.00	3.00	3.00	0.00	2.00	15.00
Measures of Location / Dispersion											
Max.	5.00	4.00	4.00	5.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00
Min.	2.00	1.00	1.00	3.00	1.00	2.00	1.00	1.00	2.00	1.00	1.00
Range	3.00	3.00	3.00	2.00	3.00	3.00	4.00	4.00	3.00	4.00	4.00
Arithmetic mean	3.00	2.41	2.50	4.28	3.13	3.78	3.00	2.61	3.88	3.25	3.18
Median	3.00	2.00	2.00	4.00	3.00	4.00	3.00	3.00	4.00	3.50	3.00
Mode	3.00	3.00	2.00	5.00	3.00	4.00	2.00	3.00	4.00	4.00	3.00

Table 4-18: Degree of use aspects of portfolio management in credit analysis/credit monitoring with view to risk factors. Source: Author's own.

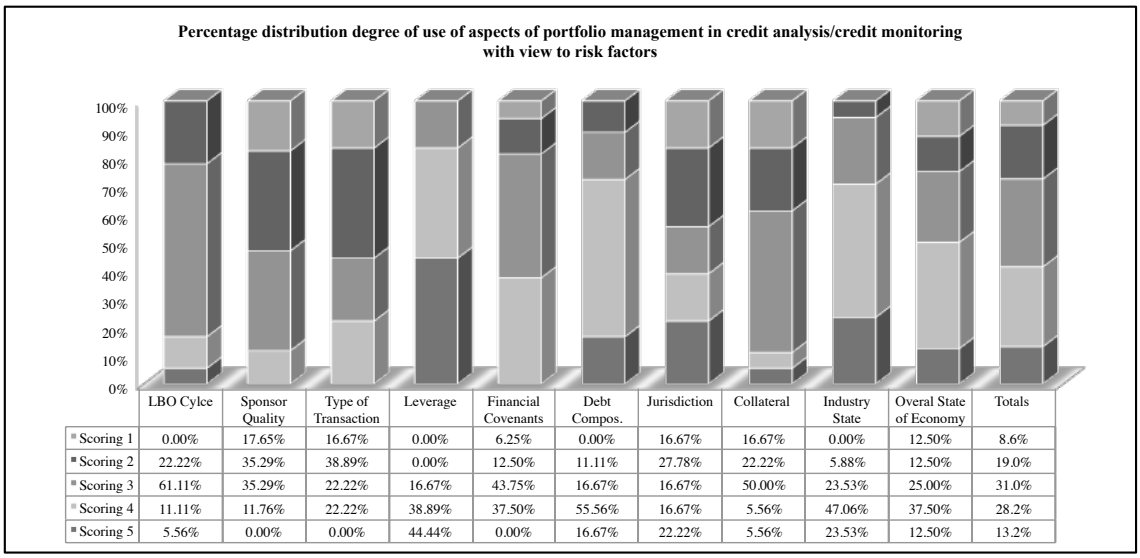


Figure 4-5: Percentage distribution degree of use of aspects of portfolio management in credit analysis/credit monitoring with view to risk factors. Source: Author's own.

The charts show that lower scoring levels appear more frequently than was the case for credit analysis and credit monitoring. Even the lowest scoring level of one was utilised. This data already suggests that the use of aspects of portfolio management in the credit analysis and credit monitoring appears to be relatively moderate.

The Friedman Test for the degree to which credit analysis and credit monitoring take into account aspects of portfolio management with regards to each of the risk factors was also performed.

Friedman Test degree credit analysis/credit monitoring take into account aspects of portfolio management (with view to the risk factors)	
Q (Observed value)	42.059
Q (Critical value)	14.684
DF	9
p-value (two-tailed)	<0.0001
alpha (Level of significance)	0.1

Table 4-19: Friedman Test degree credit analysis/credit monitoring take into account aspects of portfolio management (with view to the risk factors). Source: Author's own (using XLSTAT).

The results dictate that the null hypothesis regarding the consistent use of aspects of portfolio management within credit analysis and credit monitoring needs to be rejected.

H_o (APFM): There is no difference between the scoring levels assigned to the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors. **-> Rejected**

H_a (APFM): There is a difference between the scoring levels assigned to the degree to which credit analysis and credit monitoring take into account aspects of portfolio management relating to the risk factors. **-> Accepted**

Significant differences based on a Friedman Test and a Nemenyi Procedure degree of the use of aspects of portfolio management in credit analysis/credit monitoring (regarding risk factors)

	LBO Cycle	Sponsor Quality	Type of Transaction	Leverage	Financial Covenants	Debt Composition	Jurisdiction	Collateral	Industry State
LBO Cycle									
Sponsor Quality	No								
Type of Transaction	No	No							
Leverage	**Yes*****	**Yes*****	**Yes*****						
Financial Covenants	No	No	No	No					
Debt Composition	No	No	No	No	No				
Jurisdiction	No	No	No	**Yes***	No	No			
Collateral	No	No	No	**Yes*****	No	No	No		
Industry State	No	**Yes*****	No	No	No	No	No	**Yes***	
Overall State of Economy	No	No	No	No	No	No	No	No	No

*Table 4-20: Significant differences based on a Friedman Test and a Nemenyi procedure degree of the use of aspects of portfolio management in credit analysis/credit monitoring (regarding risk factors). Levels of significance: *at 10%; **at 5%, ***at 1%.. Source: Author's own (using XLSTAT).*

For leverage, what was said for all other dimensions remains the case: It is constantly rated highly. For the use of aspects of portfolio management, industry state also achieved very high scoring levels, explaining why the pair-wise significant differences

frequently include industry state. Eight of the 20 qualitative responses received on industry state explained that cyclicality is an important driver of recovery in a default case, which is consistent with the literature (see Section 2.3.8, p. 37) and an equal number indicated that cyclicality was an important aspect of portfolio management. However, the discussion held with participants then showed that industry state was mainly used for sector classification in general and with regards to default risk. The literature review, in contrast, pointed out that the risk factor would be particularly important for recovery risk in a sense that recoveries are significantly lower in distressed sectors due to constraints on other companies in the sector not having available finance to take over stakes in distressed companies; nor would there be an interest to invest in additional capacity. Sponsor quality, on the other hand received low scoring levels. This was supported by the qualitative elaboration with regards to this risk factor. Eight responses (24% of all responses) stated that aspects of portfolio management would not be considered in a structured way and yet 21% (seven) of responses made the point that only a negative selection based on a "poor experience" with some sponsors would take place (see Appendix 4, p. 187). A more systematic approach based on common criteria was put forward in 12% (four) of the responses.

Two participants explained that a sole view of the LBO portfolio in terms of a portfolio management approach would not be feasible, as it would typically represent a relatively small share of a bank's credit book. This is accepted, but it is argued that the management of the LBO credit book could be improved if the risk factors were analysed by utilizing some aspects of portfolio management.

Summary of research findings relating to the use of aspects of portfolio management in credit analysis and credit monitoring:

- Results indicate that the use of aspects of portfolio management in credit analysis and credit monitoring is moderate to low.
- However, a few risk factors make heavy use of aspects of portfolio management, in particular leverage, industry state and debt composition. However, for industry state this was likely to have a different focus than what the literature would suggest.

4.2.5 Results Relating to Any Additional Weaknesses and Areas for Improvement Present in Credit Functions' Management of LBOs

The research objective addressed by the results stemming from question 1.5 in the questionnaire is A7.

Research objective A7: Are there any (additional) weaknesses and areas for improvement present in credit functions' management of LBOs?

Overview of major interview results regarding"what could be done better"			
	No. category hits:	% category hits:	% of interviewees mentioning category
Take more independent / long-term view:	9.00	45.00%	50.00%
Deeper analysis of business fundamentals:	7.00	35.00%	38.89%
More pro-active management of risks:	3.00	15.00%	16.67%
More focus on management:	1.00	5.00%	5.56%
	20.00	100.00%	

Table 4-21: Overview of major interview results regarding "what could be done better". Source: Author's own.

The most frequent response to this question was that there should be more of an independent, long-term view taken by banks participating in LBO financing. This validates what was stated about the LBO cycle. There, the overall result was that there would be an awareness of the LBO cycle and also that there was an impact this has on the risk factors, but it would not be taken into account to a great degree in credit analysis and monitoring.

Despite the disparity between what was found in the literature regarding business fundamentals and the high importance ascribed to it by the participants, seven participants did mention that there should be even a deeper analysis of business fundamentals.

While not mentioned by many participants, it is still worth elaborating on the fact that there was some mention of more active management. During the discussions it was explained that this meant that there should be consequences drawn from the results of credit analysis, credit monitoring and the inclusion of portfolio management.

Finally, one person mentioned that there should be more focus on the management, since the constraints and the specific targets imposed by an LBO structure requires special management skills. This is a valid point and was not investigated in the literature review and this is not the place to investigate this further. However, it represents a further interesting topic for future research.

4.3 Research Results Synthesis

The overall research aim had been stated as:

- To identify potential areas for improvement in the credit management process of LBO credits by credit functions and – provided they can be identified – deduce potential measures how to address them.

Research objectives A1-A7 and research objective B were established to fulfil the above research aim. Research objective B provides the bridge between research objectives A1-A7 and the overall research aim.

- **Research objective B:** To integrate the results from research objectives A1-A7 and deduce potential measures to address identified areas for improvement.

This section aims to synthesize the results and to provide an interpretative discussion on them. This provides the basis for conclusions drawn, which represents the final step in achieving research objective B.

The results of the research can be synthesised as follows:

- Credit functions are well aware of the risk factors driving the credit risk of LBOs. This is supported by the high level of consistency between those risk factors initially mentioned in response to the open question 1.2 and those found in the literature (Section 4.2.2, p. 88, Table 4-3, p. 89) as well as the consistency with the aspects related to the experience that banks made in the LBO market (Table 4-2, p. 86).

- There is significant recognition for an LBO cycle and it is recognised that some of these factors change substantially in an adverse direction during an upward cycle. This is supported by:

- The cyclicality in the LBO market being mentioned initially in response to question 1.1 (asking about the experience banks have had) by nine out of 18 participants (see Section 4.2.1, p. 84; Table 4-2 p. 86).

- The high number of participants (15 out of 18) clearly agreeing on the existence of an LBO cycle when directly asked about it (see Section 4.2.1, p. 84, Table 4-1, p. 85)

- Clear awareness of signals for an increasing LBO cycle (see Section 4.2.1, p. 84, Table 4-1, p. 85).

- The claim for a more independent view (as in response to question 1.5, asking what could be done better) also indicates that there is a cyclical phenomenon and behaviour by participating banks (Section 4.2.5, p. 109, Table 4-21, p. 109; details to individual questions shown in Appendix 4, p. 187).

- The literature (see Section 2.3.10, p. 39).

• The LBO cycle is, despite its existence, not systematically taken into account as part of the credit management process. This is supported by:

- The interpretation of the results of the survey performed by the BSC (see Section 2.5, p. 47).

- Relatively low scoring levels assigned for the use of the LBO cycle in credit analysis and credit monitoring, with the majority being concentrated between two and four (see Section 4.2.3, p. 97, Table 4-11, p. 99; Table 4-12, p. 99).

- Low scoring levels assigned for the use of aspects of portfolio management in credit analysis/credit monitoring with regards to the LBO cycle (see Section 4.2.4, p. 105; Table 4-18, p. 106)

- Qualitative comments relating to the LBO cycle, with statements from ten participants having been classified as a “lack of consistent monitoring” (see Section 4.2.1, p. 84, Table 4-1, p. 85). The same or

similar comments were also made for a number of individual risk factors, which are representative of the LBO cycle (see Appendix 4, p. 187).

- The risk factors found in the literature review are generally viewed as important for both default risk and recovery risk. This is supported by:
    - 81% of all scoring levels for the importance of risk factors for the default risk being scored a four or five (Section 4.2.2, p. 88, Table 4-4, p. 92).
    - 79% of all scoring levels for the importance for the recovery risk being given a four or five (Section 4.2.2, p. 88; Table 4-5, p. 93).
    - For the default risk, the scoring levels are generally very homogenous with the exception of leverage, which was an outlier on the positive side (Section 4.2.2, p. 88; Table 4-4, p. 92; Table 4-6, p. 94; Table 4-8, p. 95).
    - The rejection of the hypothesis test for the importance of the recovery risk being driven by a few outliers, which achieved very high scoring levels. For recovery risk, besides leverage these jurisdiction and debt composition (Section 4.2.2, p. 88, Table 4-14, p. 101). For these, the scores very high in particular in relation to financial covenants, which achieved low scoring levels.
- Not all of the risk factors received a high level of attention in the credit analysis and credit monitoring and potentially there are cases where the degree to which they are used in credit analysis and credit monitoring does not match the importance they have on the credit risk. This is supported by:
    - Testimony of more aggressive structuring towards the financial crisis (2007), which suggests some greater tolerance of the risk factors (Section 1.1, p. 1, Section 2.7, p. 50 as well as research by Cao, Mason and Song (2010), Section 2.5, p. 47). This is further supported by the focus on distribution by major arranging banks (Section 2.3.10, p. 39).

- The more dispersed scoring levels for the use of risk factors in credit analysis and credit monitoring (Section 4.2.3, p. 97, Table 4-11, p. 99; Table 4-12, p. 99). Only 64% of all the scorings assigned for the use of risk factors in credit analysis were at the levels of four and five.

- The rejection of the hypothesis testing consistency of scoring levels for the use of risk factors in credit analysis and credit monitoring (Section 4.2.3, p. 97) which is driven by several risk factors showing strong dispersion between the risk factors (Table 4-13, p. 101; Table 4-14, p. 101).

- Responses relating to individual risk factors also point in this direction (see Appendix 4, p. 187 for a full overview). For example, the response categories for sponsor quality, type of transaction or financial covenants indicate that they do not play a major role in credit analysis and credit monitoring.

- Albeit with limitations as to the interpretation, there is a disparity between the scoring levels assigned for the importance of risk factors and those regarding their use (compare Table 4-4, p. 92 and Table 4-5, p. 93 and Table 4-11, p. 99 and Table 4-12, p. 99)

• In particular when considering credit monitoring, many of the risk factors are viewed as a given, as they cannot be altered once a transaction has been entered into. This leads to them receiving less attention in credit monitoring compared to the attention they receive in credit management. This is supported by:

  - Relative low scoring levels assigned for the use of some risk factors in credit monitoring, such as for sponsor quality, type of transaction, collateral and jurisdiction (Table 4-12, p. 99).

  - Rejection of the hypothesis that the scoring levels are the same for the risk factors in credit monitoring, which cannot be traced back to an individual outlier factor Table 4-14, p. 101, Table 4-16, p. 102).

- Qualitative statements relating to these scoring factors (see Appendix 4, page, p.187).

- Aspects of portfolio management were not considered to a great degree overall. This is supported by:

  - The literature review quoting the results of a survey by the BSC (see Section 2.5, p. 47).

  - Only 42% of all scoring levels assigned for the degree to which credit analysis and credit monitoring take into account aspects of portfolio management were at the levels of four and five (Section 4.2.4, p. 105, Table 4-18, p. 106).

  - Responses to question 3.0 where six participants responded that these exposures were not analysed with regards to a wider portfolio (Section 4.2.4; Table 4-17, p. 105). That six participants responded in this way appears high given that the question was phrased as a "yes or no" question and their was a subsequent request for explanation.

  - Comments received to sponsor quality, type of transaction and financial covenants indicate that these are not viewed within a wider portfolio (Appendix 4, p. 187).

- Recovery risk is of less concern, despite the risk factors also generally receiving high scoring levels for their importance for the recovery risk. This is supported by:

  - Scoring levels for the importance of risk factors for recovery risk are more widely dispersed (Section 4.2.2, p. 88, Table 4-4, p. 92, Table 4-5, p. 93).

  - Recovery risk not being mentioned frequently within the qualitative comments, in particular those received in relation to questions 1.2 and 1.3 (Section 4.2.2, p. 88 and 4.2.3, p. 97, Table 4-2, p. 86; Table 4-3, p. 89).

4.4 Plausibility Checks

The research had used a mixed approach to ensure a level of built-in validation. Further triangulation and validation is one of the areas recommended for further research (See Section 5.5, p. 133) and could not have been completed within this research based due to the time requirement involved as well as access requirements which could not have been met. Yet, it was viewed sensible to expose the key points of the research, at least for a plausibility check to further experts. Therefore, the results were exposed to:

- Four independent senior credit executives.
- The credit function of a bank.

4.4.1 Discussion with Four Independent Senior Credit Executives

These four senior credit executives all had substantial experience in the LBO market, which was received from various banks. None of them had been part of the main study.

Using the table employed in Section 3.3.4 (p. 63), the experience can be described as follows.

Overview of background of participants in the plausbility check

	Most recent position with exposure to LBOs	NoE LBO Ex.	Thereof Banks	Banks
Participant 1	Division Head / MD Structuring Team	2	2	I, K
Participant 2	Division Head / MD Structuring Team	1	1	G
Participant 3	Department Head / MD Syndication Team	3	3	A, E, J
Participant 4	Senior Structuring Professional	2	2	A, E, L.
	Totals of Participants Plausibility Check:	8	8	I, J, K, L: 4
	Relating to Total Participants in the Study:	42	29	A-L: 12

Table 4-22: Overview of background of participants in the plausibility check. Source: Author's own.

The participants had a total of eight employments in banks. As with the main study, there was some overlap in terms of which bank participants had worked for, albeit this was usually at different times in the past. This broadens the perspective of the research from a total of nine different banks to a total of 12 following these discussions, albeit the set-up was different.

Division heads were both at banks with significant European LBO activity, based in Germany. Due to their position being close to the board of management (one or two levels away), these executives did have oversight of LBO teams as part of a wider scope that includes other specialised lending products. This was also the case for the syndication professional. The three aforementioned participants all had more than 15 years of credit experience, with significant oversight roles for LBO structuring or syndication teams. The person with the least experience was a senior structure at a large international investment bank. This person's total experience with LBOs from the two banks she worked for was approximately ten years. Broken down by geography, the three banks not included in the main sample had their headquarters in Germany, France and in a Nordic country.

The discussions took place between October 2012 and January 2013. Prior to the discussions, the executives received a presentation (See Appendix 5, p. 191) that summarised the main research results by email in advance. The conversations lasted about 45-60 minutes on each occasion and notes were taken during the presentation by the researcher. Two meeting took place at the executives' office and the other two at restaurants during lunchtime. The conversations were held in German and comments have therefore been translated into English. For the same reasons as discussed for the main study, these meetings were not recorded (see Section 3.3.5, p. 68).

Overall, there was a high level of agreement with the analytical results of the research and the potential measures provided to enhance effectiveness of the credit management process by credit functions. The risk drivers were generally agreed with and there was clear agreement from all four participants that there would be an LBO cycle. Two statements are particularly illustrative of this:

> *"During the last upside cycle, the majority of the transactions came to the market with (very) high multiples, no matter what sector they were operating in. There was a time where leverage was at 6x or 7x, no matter what the company did."*

> *"I think this was largely driven by the ability of banks to sell-down their exposure and significant credit had (wrongfully) been given to the main*

arranging banks having taken care in matching fundamentals to capital structure."

Another person highlighted that the current market environment already points at a high cyclical point again, with back-loaded structures again becoming commonplace. Asked why there were no consequences drawn from this, an interesting response was received along the lines of that this would not be possible due to the repeat borrowing behaviour of some sponsors and therefore it would be difficult to withdraw from the market temporarily. This reinforces the case that the LBO cycle is actually recognised, but does not present a main driver in the decision making process.

Also, all participants agreed strongly that the risk factors were relevant for both default risk and recovery risk generally, but that recovery risk would not receive equal attention compared to default risk in credit analysis and credit monitoring. In part, this was explained by a general view not to bother about recovery, because loans would only be entered into if there was a strong expectation that they would perform. However, given that LBOs by their nature have an above average risk of default risk, this is actually surprising. One participant explained this in more specific terms, outlining that this is just not the guidance credit functions would be given. Their evaluation would be based on incurring limited defaults (and hence limited provisions), whereas net debt provisions would not be the focus of their governance structure in the first place.

Regarding the relatively low attention paid to some risk factors in credit analysis and credit monitoring, or the inconsistent treatment of them, the participants did not fully agree with the results outlined in the study. For example, sponsor quality was one point where one participant outlined that this would receive significant attention in credit analysis and credit monitoring and that experiences a bank had with regards to certain sponsors would exert strong influence on credit decisions. Similar comments were received from the other participants. However, only one participant explained that this goes beyond a negative selection process in the sense that sponsors are evaluated with regards to their expertise in certain sectors for example.

Overall, the view was that the risk factors all receive significant attention in credit analysis and monitoring, which is not 100% consistent with the results of the primary study. However, there was an explanation that the degree to which factors are dealt with

depends on the individual transaction structure and circumstances at the time. This actually adds to the argument that there is frequently a lack of consistent application of risk factors i.e. transactions are not evaluated systematically based on the risk factors and conclusions are not drawn consistently from the risk factor analysis.

With regards to the low consideration of aspects of portfolio management, there was also a good level of agreement despite one participant opposing the conclusion. It was explained that the whole portfolio would regularly be reviewed on a case-by-case basis and decisions drawn from this and this would also include the view on certain risk factors within the context of the wider portfolio. However, it was admitted that this could be improved by including more parameters over time. None of the participants commented in any respect that there was a systematic feedback-loop with portfolio management in place, for example. This is partly attributed to organisational matters, such as where to allocate an LBO portfolio management team.

An interesting reasoning put forward as to why there was limited consideration of portfolio aspects with regards to LBOs was that up to the crisis they had been viewed as a tradable asset and the experience so far was also positive. Instead, refinancing frequently took place after two-three years and there was a perception that it would simply go on like this. Another executive explained that portfolio management would generally be viewed a highly regarded subject and would increasingly produce valuable information. However, this would not necessarily be the case for the evaluation of an individual transaction and the parameters of measurement would not be particularly geared to LBOs. One person commented that there would be significant volumes of data available, but little guidance as to what to do with it.

4.4.2 Presentation of Results to the Credit Function of a Bank

As a final step to enhance the reliability and validity of the study, the results were presented to a group of credit function analysts of one bank at its headquarters. The bank is a sizeable bank with its headquarters in Germany and amongst the banks from which participants were included. The bank had noticeable LBO activities in the last decade, both as a participant and an arranger of transactions. For reasons of anonymity, no further details can be provided here.

The group consisted of a total of seven participants, including the head of the team. Of the seven participants, two were also interviewees in the main study. The remaining five participants were not previously involved in the study.

All participants had analysed LBO credits before and had several years of credit experience. The meeting lasted approximately one hour. As with the exposing of results to the credit executive, research findings were presented in a power-point presentation and comments were invited. Research notes were taken and summarised subsequently and were then shown to the team head to ensure they were correct. As a general statement, what was found is that comments were rather scarce. For a large part of the meeting, there was a silent absorption of what was presented and it required some encouragement to engage people in the discussion. One potential factor for this is the culture of credit functions, where members frequently work on their own in quiet atmospheres. Another factor that was likely to have an impact was the presence of their boss, which could lead to hesitation about commenting (see Chapter 3, Section 3.3.5, p. 68 for a discussion to this effect).

One of the areas where comments were received was in the area of recovery risk. It was agreed that this should be a comprehensive part of the overall credit work, which supports the requirement to include recovery risk as part of the regular credit analysis work. The other two aspects mentioned are closely linked. There was a view that it would be very difficult to argue against the market momentum in an upward cycle. This is consistent with the view of the LBO cycle resulting from the main study and also from the discussion with the four credit executives. This relates to results having to be authoritative. It was agreed that the majority of the risk factors would deteriorate in such an environment, but even the flagging by some portfolio management tools would be unlikely to stop this because at such times these more aggressively structured transactions are the only ones available. This is also consistent with what one of the credit executives explained, in a sense that sponsors cannot be disinvited temporarily.

The results are interpreted collectively and some inter-dependencies become apparent. The fact that the LBO cycle is not systematically monitored makes it difficult to view market developments in the risk factors. This leads to transactions being benchmarked against the most recent deals, which are viewed as the standard. This means that there is a drift in the acceptability of the risk factors with a slow trend to more tolerance.

This in consequence means that credit analysis and credit monitoring do not take into account all the information that would be useful to fulfil the task of risk assessment. This is exacerbated by not all risk factors receiving the same level of attention and generally the focus being reduced in credit monitoring. An information gap can also be identified, as recovery risk is not considered to the same extent as default risk is. This is further discussed in the next chapter.

Chapter 5: Conclusion, Limitations and Further Research

5.1 Conclusion

Within this chapter, the results from Chapter 4 are utilised to draw the conclusions from the study, which ultimately leads to achieving the research aim. Interpreting the results concurrently, the following picture emerges. The graph will be discussed in more detail below here.

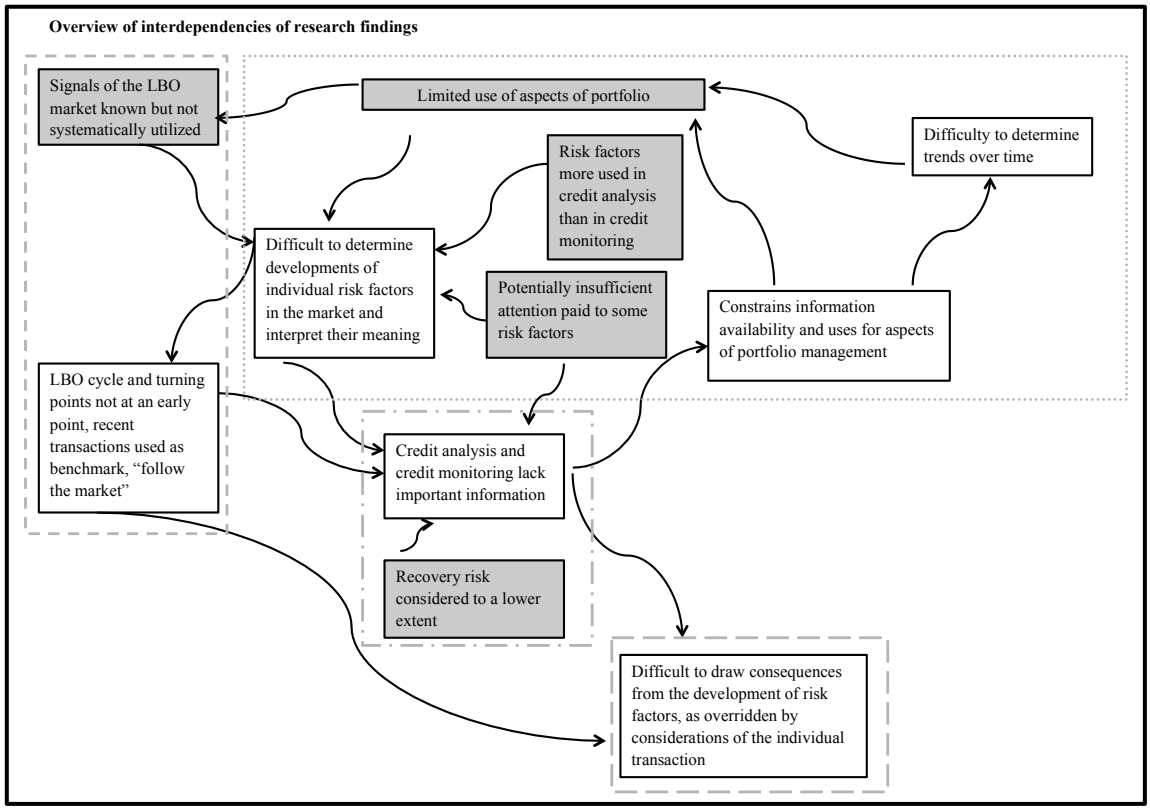


Figure 5-1: Overview of interdependencies of research findings. Source: Author's own.

The literature (Section 2.3.10, p. 39) as well as available data about debt-multiples and development of covenants (e.g. Deutsche Bundesbank, 2006 and 2007, Ernst & Young 2013) has provided strong evidence that there is a cyclical phenomenon in LBO activity. This was clearly supported by the responses received (see Section 4.2.1, p. 84 and 4.2.2, p. 88). Against this, while signals are noticed, the data suggested that these were not always taken into account in a systematic manner. This is likely a key area for improvement as the LBO cycle is associated with changes in the remaining risk factors. When referring to the LBO cycle alone as a risk factor, it is one that appears to be

overarching, but the attention that has been given to it in credit monitoring (mean 3.16, mode and median 3.0; see Table 4-12, p. 99) and credit analysis (mean 3.74, mode and median 4.0, Table 4-11, p. 99) did not match its importance. This is supported by statements made by several participants, for example, that the point in the LBO cycle would not be a sufficient reason to decline a transaction (Section 4.1.2, p. 87) and that this was overridden by fundamental of the business. However, the rise in defaults (e.g. PWC, 2010) as well as the previous rise in leverage (e.g. Deutsche Bundesbank, 2007, Ernst & Young 2013, FSA 2006) in these transactions combined with fewer covenants; Deutsche Bundesbank 2006, Acharya 2007; Demiroglu and James, 2010) and the low correlation of capital structure with business fundamentals (Axelson, 2013 / Brinkhuis and De Maeseneire, 2012) in tandem with the rise in secondary and tertiary buyouts (Kaplan / Strömberg, 2009) which tend to be more levered (Brinkhuis and De Maeseneire, 2012 and Bergström 2007) clearly suggests that these risk factors are subject to cyclical moves.

The individual risk factors are generally well known, as evidenced by the high score regarding their importance (mean score default risk 4.19, mean score recovery risk 4.18 with median and mode at 4.0 and 5.0 respectively for both cases, see Table 4-4, p. 92 and Table 4-5, p. 93) and the frequency with which they were mentioned in the open questions (Section 4.2 or for full overview see Appendix 3, p. 187). Interviewees mentioned seven out of the ten risk factors in response to question 1.2 (see Table 4-3, p. 89). The only ones missing were type of transaction, debt composition and overall state of the economy. Leverage, type of transaction, financial covenants, debt composition have been reported to vary with cyclical moves both in the literature review and based on this research. Amongst them, higher leverage, lower documentation standards (which includes covenants) as well as type of transaction (more secondaries/tertiaries) were also named as variables showing the state of the LBO cycle. This further supports the awareness of the importance of an LBO cycle on the risk (see Section 4.2.1, p. 84).

In terms of importance for the default and the recovery risk, the risk factors are judged differently. For default risk, leverage is the risk factor that achieves the highest scoring level (see Table 4-4, p. 92) and the dispersion of the responses also shows that this is the least controversial (with a range of 1) and almost 90% of respondents scoring the importance at a level of five. Referring to the literature, this shows the importance of

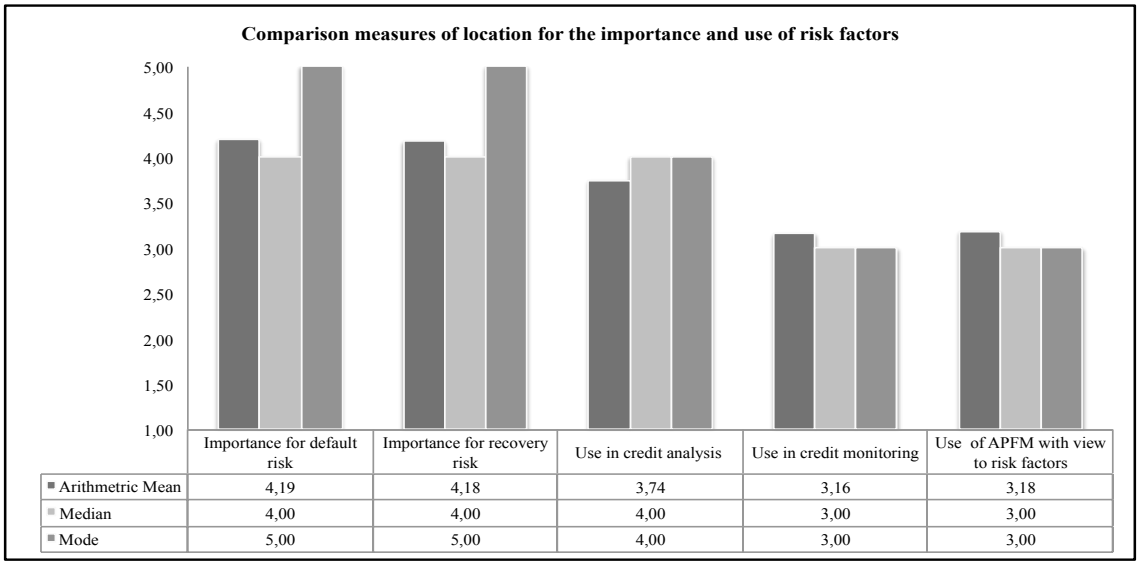
debt quantum and linked to this debt composition for the default risk in LBOs. This is consistent with Axelson et al. (2013, 2010) in so far as they found that capital structure is not correlated to business fundamentals of a company, which indicates that it is an important driver in the default risk on its own. The next most important risk factors for default risk was sponsor quality in the viewpoint of the participants. A total of 84% of respondents have allocated a score of four or five for this risk factor. The literature had also suggested that sponsor quality was an important factor for the default risk and the recovery risk (Section 2.3.1, p. 24). The next most important risk factor is the type of transaction which approximately 83% of all respondents allocating scoring levels of four or five. Financial covenants and debt composition are viewed to be of lower importance, albeit still at high levels (average scoring level at 3,94 and 3,89 respectively; see Figure 4-1, p. 92). However, overall the risk factors are all viewed important for the default risk, as reflected by their high average scoring level for the entire sample.

Where the LBO cycle is not considered systematically, it is also difficult to interpret the development of individual risk factors and take decisions based on this and important turning points may not be realized. In contrast, transactions would only be benchmarked against most recent transactions and a drift in the risk factors compared to long-term standards is unrecognised or if noted, not necessarily acted upon.

Regarding recovery risk, leverage is also the most important factor, where scoring levels of five account for approximately 94% of the total scoring levels allocated (see Figure 4-2, p. 93). This is consistent with the basic assumption that less debt means more economic value cushion and therefore more value to distribute and more re-structuring options available once a default has occurred. Other than that, the most important factors were debt composition, jurisdiction, collateral and industry state; which is broadly in line with what the literature suggests (see Sections 2.3.5, p. 34; 2.3.6, p. 35; 2.3.7, p. 37 and 2.3.8, p. 37). On industry state, this needs to be qualified as the literature was not strongly supportive and suggested mainly that recoveries are low in distressed sectors (see 2.3.8, p.37) but that there was no pattern of certain sectors receiving structurally lower recoveries. Still, 79% of all participants have allocated a scoring level of four or five to the importance of industry state for recovery risk. What also becomes apparent is that the distribution of the scoring levels for recovery risk is

much wider (see Figure 4-2, p. 92; Figure 4-1, p.92). This indicates that the opinions vary more on recovery risk; which was supported by qualitative comments received such as *"recovery risk being under-represented"* (p. 91).

Turning to the use of risk factors in credit analysis, credit monitoring and the degree to which these use aspects of portfolio management with view to the risk factors, the first observation that can be made is that the scoring levels are generally lower than those provided for the importance of risk factors. At the minimum, this indicates that the use of the risk factors and the degree to which credit analysis and credit monitoring take into account aspects of APFM are not consistent with the importance seen for them. However, some caution is required with regards to such an interpretation since the scales measured different things (i.e. the importance of vs. the use of). Nevertheless, the picture gives rise to assume this. Irrespective of the scoring levels, one would assume that the risk factors that have received the highest scoring levels for the importance would also be the ones that receive the most attention in credit analysis and credit monitoring. At the same time, it would be expected that simple measures of portfolio management are applied with view to these risk factors.



	Importance for default risk	Importance for recovery risk	Use in credit analysis	Use in credit monitoring	Use of APFM with view to risk factors
Arithmetic Mean	4,19	4,18	3,74	3,16	3,18
Median	4,00	4,00	4,00	3,00	3,00
Mode	5,00	5,00	4,00	3,00	3,00

Figure 5-2: Comparison measures of location for the importance and use of risk factors. Source: Author's own.

The table on the next page shows the three highest scoring levels (based on the arithmetic mean) assigned to risk factors in each category. The consistency is only present for leverage.

Top three risk factors relating to their importance and use in the credit management process (based on arithmetic mean scoring levels)				
Importance for Default Risk	Importance for Recovery Risk	Use in Credit Analysis	Use in Credit Monitoring	Use of Aspects of Portfolio Management (CM/CA)
• Leverage • LBO Cycle • Sponsor Quality	• Leverage • Jurisdiction • Industry State	• Leverage • Debt Composition • Industry State	• Leverage • Financial Covenants • Debt Composition	• Leverage • Industry State • Debt Composition

Table 5-1: Top risk factors relating to their importance and use in the credit management process. Source: Author's own.

The scoring level of five is not utilised frequently as far as the use in credit analysis is concerned (see Figure 4-3, p. 99) with the exception of leverage, which has 78% of all responses allocated to this level. Sponsor quality was viewed to receive only moderate attention in credit analysis, despite its high importance for default risk (and still for recovery risk). Also, the type of transaction received relatively low levels with view to its use in credit analysis, despite this was an important factor for default risk as well. Other than leverage, the factor that received most attention based on average scoring levels was debt composition with an arithmetic mean of 4.11 and approximately 83% of scoring levels allocated at a level of five or four. This also shows that debt composition together with leverage as the overall capital structure are important risk determinants; irrespective of the individual business risk, which was stated to be an overriding factor. However, the overall LBO cycle achieves the lowest level of average scoring in the whole distribution for credit analysis.

Those factors that were important for recovery risk, in particular jurisdiction and collateral have also received relatively lower scoring levels then one would assume given their high importance. They receive arithmetic mean scoring levels of 3.5 and 3.72 respectively for their use in credit analysis and "only" 2.72 and 2.78 for the use in

credit monitoring (see Table 4-11, p. 99 and Table 4-12, p. 99). This is consistent with the overall assessment that recovery risk is less of an aspect considered.

The most heavily used risk factors in credit monitoring are leverage, debt composition and financial covenants (Figure 4-4, p. 100). The LBO cycle, sponsor quality, type of transaction, jurisdiction and collateral receive relatively low scoring levels (see Figure 4-4, p. 100), despite their acknowledged importance for credit risk. In part this was explained by many of these factors not being subject to change. For example a tertiary buyout remains a tertiary buyout and a transaction undertaken in a certain jurisdiction does normally not change unless in the exceptional case that the business is moved.

The low consideration of the LBO cycle as such as well as the relatively low consideration of some risk factors in credit analysis and credit monitoring (see above) means that both may be lacking important information on the credit risk. This is exacerbated by the overall lower attention paid to recovery risk (Section 4.2.3, p. 97). Two consequences emerge from this. One is that it is difficult to draw consequences from the development of the risk factors. For example, if sponsor quality or type of transaction receive relatively little attention, then it is also difficult to see how consequences in terms of the credit management can be drawn from this. For example, the treatment of a secondary buyout is unlikely to differ from that of a primary buyout if the type of transaction is not considered as part of the credit analysis/credit monitoring. However, this might be justified based on different performance improvement characteristics or the sponsor involved which can have an impact. A directly related consequence of this is that this constrains the availability of data for the uses of aspects of portfolio management. For example, a portfolio management could track the number of secondary and tertiary buyout and they may be measured on a different set of variables then primary transactions. However, these are unlikely to be discovered if the type of transaction does not play an important role in credit analysis and credit monitoring. Also, signals indicating an increasingly aggressive LBO market are unlikely to be recognised if there is not a consistent and rigor evaluation of this as the level of the credit monitoring and credit analysis. This in consequence limits the use of aspects of portfolio management. For example, headroom under covenants or the performance of secondary buyouts and their average credit duration or the seniority

measure (both discussed in Section 2.4, p. 44) cannot be taken into account if not consistently analysed and input at the level of credit analysis and credit monitoring.

The data confirms this argument. The mode level score for the degree to which aspects of portfolio management are used is three for seven out of the ten risk factors (see Table 4-18, p. 106). The only risk factor achieving scores of five and four are leverage (five) and industry state as well as the overall state of the economy. Regarding industry state, the responses were frequently related to broad industry classifications. While these are analysed with view to their overall prospects and risk, the analysis would not typically look at recoveries in the industry specifically. In particular, limited capacity of competitors to acquire businesses (which impacts recoveries) would not be taken into account. Overall state of the economy was stated to be a key-factor; but one participant also explained that there would not be something like a clustering of the portfolio depending on their sensitivity to economic cycles (for example: very strong, strong, moderate defensive). Important factors such as type of transaction, financial covenants or debt composition all receive low scores with view to the degree the analysis or monitoring takes into account aspects of portfolio management. This despite this could easily be achieved, such as clustering covenants on such as strong, moderate, weak for example or clustering the portfolio' debt composition based on a seniority measure or duration measures.

The discussion above remains indicative as the research was purely exploratory and had some limitations (see Section 5.4, p.132). With this qualification in mind the areas for improvement and potential ways to address them can be summarised as follows:

- **Inclusion of systematic risk** (i.e. LBO cycle) in the credit risk assessment of new transactions but also in the credit monitoring since its importance has been clearly demonstrated and confirmed by this research. For this purpose, changes in risk factors would have to be calibrated against the wider LBO cycle. Ideally, the focus would be on leading indicators. The interviewees have described the signals have described the signals for an LBO cycle exhaustively and this is largely backed by the findings in the literature. This is also supported by the response that many participants gave with regards to what banks could do better (Table 4-21, p. 109) where nine of the participants stated that a more independent / longer term view was an area for improvement. This can be interpreted as a view that is detached from the

most current market momentum, but takes into account the longer-term picture. However, what remains open is which of these signals listed in Table 4-1 (p. 85) are leading indicators, which are concurrent indicators and lagging indicators. For this purpose, the measurement of the risk factors has to be operationalized and then a backward test of their development towards cyclical peaks (last 2007; before then 2001) would have to be performed. In order to ensure that those factors are chosen that clearly change towards the cyclical peaks, this back testing would have to be replicated to non-peak levels as well for control purposes. Only those factors that change only for the peak-level, but show relative stability towards the non-cyclical peaks should be chosen. At a later stage, such an indicator model may be refined to avoid intra-correlation between the risk factors; i.e. translated into a multiple-regression analysis.

- **Completeness of LBO credit risk assessment giving** using them to a degree that is commensurate with their importance. For the factors sponsor quality, type of transaction, debt composition and financial covenants the research suggests that they are similar important as is leverage. The data and the synthesis suggest that these factors should receive more attention in all areas of the credit management process. Minimum standards regarding their analysis and objectively measureable data about these factors could be derived (for example development of covenant headroom; seniority measure as outlined by Cotter and Peck, 2001) and used. For the factors relating purely to recovery risk on the other side, the analysis suggests that industry state is a factor that needs to be analysed within a very specific context, i.e. if the default is likely to be in a sector that is regarded distressed. A wider, systematic differentiation of recoveries by sector had not been found. Overall, there was agreement in the empirical part of this research that recovery should be an important aspect of the credit management process; standardized recovery analysis would be a sensible step to this end.
- **Integration of credit analysis, credit monitoring and the use of aspects of portfolio management.** This systematic inclusion of portfolio-considerations in the assessment of individual exposures and the feeding back of information from the credit analysis/credit monitoring to portfolio-management is a requirement for this to become a close circuit type of system. Information derived in credit analysis for example needs to be fed to portfolio management so that the development of the risk

factors within the portfolio can be measured. Credit monitoring also needs to provide information to credit portfolio management, for example such as observed performance of secondary transactions vs. primary transactions; this can then be used to continuously re-define guidelines or minimum standards.

The description above would lead to an integrated credit management process for LBOs, which is conceptually illustrated by Figure 5-3 below.

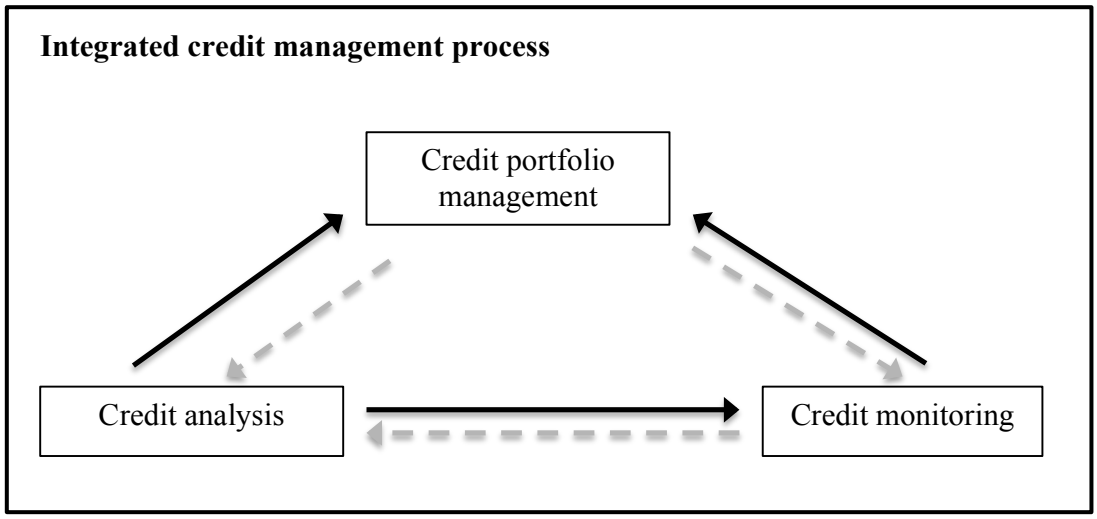


Figure 5-3: Integrated credit management process. Source: Author's own.

- **Utilisation of Results.** Finally, if the above was accomplished then the results would need to lead to some consequences. In absence of such, this would remain a pure analysis tool without implications. Albeit few participants mentioned this (see Table 4-21, p. 109), it is an important consideration.

Before the above is addressed, further triangulation and validation of the results would be required. If those confirmed the results of this research, a first step would be to operationalize the individual risk factors; that is how are they measured and integrated.

5.2 Summary of the Study

The study took the phenomenon of increasingly aggressive LBO transactions and in parallel the expansion of LBO lending by banks as a starting point. As soon as the financial crisis of 2007/2008 emerged, the results were an increasing number of defaults and write-offs on banks' balance sheets. It was decided that the role of credit functions within this is worthy of analysis. The literature review looked at risk factors in LBOs

and highlighted the existence of an LBO cycle that represented an area of systematic risk. The literature also flagged some easy-to-use tools of portfolio management and took advantage of a survey that was related to risk management practices with regards to LBOs by banks. Here, an inconsistency was discovered. If the risk management practices had been as the survey results suggested, then much of the expansion in LBOs may not have occurred. This suggested that the work of credit functions offers areas for improvement. Research questions and a research aim were formulated which were then broken down into a series of specific research objectives.

The research aim was formulated as:

- To identify potential areas for improvement in the credit management process of LBO credits by credit functions and – provided they can be identified – deduce potential measures how to address them.

To meet its research aim and objectives, an interview questionnaire was developed and interviews with 18 participants were carried out. The data collected and subsequent analysis was quantitative and qualitative to enhance the reliability of the study. The results have indicated that there are several areas for improvement in the work of credit functions. The most relevant from this research are at a conceptual level and centre around the following four aspects:

- Inclusion of systematic risk.
- Completeness of credit risk evaluation.
- Systematic integration of credit analysis, credit monitoring and credit portfolio management.
- Utilisation of results.

The thesis argued that addressing these points would be likely to enhance the effectiveness of LBO credit risk management. The areas for improvement are interrelated and inefficiencies in one area are likely to reinforce problems in another area.

5.3 Contribution to Knowledge

While the research remains exploratory and the results must be viewed as indicative, it is unique so far in terms of access and as it confronts the importance of risk factors and opinions on how important credit functions view them in their work. It also highlights how credit functions actually use of the risk factors in the management of LBO credit risk. To the best knowledge of the author, no prior research exists that has combined the fields in this manner, albeit this is surprising. Credit functions are the organisational units where the actual analysis work on individual exposures takes place and ultimately, the sum of individual exposures makes up the whole banks risk position (prior to any hedging activities).

The indicative results of this research make several contributions to knowledge in the field of LBO credit management. First, they provide an up-to-date overview and critical discussion of the empirical evidence on LBO risk factors, which has a value of its own. Moreover, they have been validated by the views of a number of experts.

Secondly, the research provided indicative results of the work of credit functions in relation to LBOs. Important results are that there appears to be lack of consideration of systematic risk in LBOs, that the credit assessment takes less advantage of risk factors in credit monitoring, that recovery risk is not at the forefront of the analysis and that aspects of portfolio management play a subordinated role in the work of credit functions when they assess LBO credit risks on individual transactions. It has been argued that this combination of factors contributes to unintended inefficiencies in the work of credit functions that ought to be addressed. The thesis argues that the identified areas for improvement could be addressed by operationalizing the risk factors and stronger integration between credit analysis, credit monitoring and the use of credit management. The relationship between the areas for improvement that were identified has been illustrated in an interdependency chart (see. Figure 5-1, p. 121).

Finally, the research offers several avenues for further research to be undertaken. These are discussed further below.

5.4 Limitations of the Study

Research results are commonly subject to limitations and this study is no exception to this. The most important limitations are discussed in this section.

5.4.1 Sample Selection and Composition

The selection and the composition of the sample were based on convenience aspects. The specific access made the study unique. This was discussed in Chapter 3 (Section 3.3.4, p. 63) in detail and some elements are there to prevent the study from becoming unacceptably skewed. The number of participants with a total of 18 in the main study remains limited, albeit them having a total experience from nine different banks and many years of individual experience.

5.4.2 Geographic Focus

Participants in the study had worked for European banks (with one bank having its headquarters outside Europe, but a regional headquarter in the UK), whilst some of the academic literature related to US data. There could be structural differences in these markets at the level of the LBOs as well as at the level of the credit functions performing the credit management process. However, in particular with view to LBOs these are unlikely to be so significant as this business field has become very international in recent years with many US PE houses being active in Europe and vice-versa. In addition, while all the banks had sizeable European LBO activity, the participants were based in Germany with one exception.

5.4.3 Interview Process and Timing

The interviews took place over a period of 13 months, with the last once in April 2012. The banking sector is dynamic and changes may have occurred. This is somehow guarded against by the presentation of the results to the four independent senior executives and to the credit function of one bank, which only took place end of 2012. Nevertheless, some of the findings of this research may actually have been addressed already. One participants' comment illustrated this:

"The role of the credit function has changed. It is less a question of how well one thinks a deal can be sold. The focus has shifted towards the acceptance of permanent holding".

Furthermore, for the reasons outlined in Section 3.3.5 (p. 68), the interviews were not recorded. The procedure applied with the taking of notes and the subsequent production of summaries in English language creates a risk of losing information or introducing biases. While the researcher has made strong efforts to keep the research free of biases, this risk remains present.

5.4.4 Lack of Triangulation Processes

Due to time and access constraints owed to the exploratory nature of this study, there was no possibility to triangulate the results. This is partly mitigated by the additional plausibility checks that have been undertaken, but the study results would benefit from further triangulation.

5.5 Recommendations for Further Research

Broadening the scope of the research would be useful. Triangulating the results of the study by using different data generation methods and different analytical techniques would also be beneficial. For example, researchers could try to validate and triangulate the data of this study by performing reviews of credit analysis papers produced by credit functions. Methodological triangulation continues to enhance reliability of research results (Modell, 2009) and therefore remains highly desired.

A parallel application of this research to other specialised lending products could also provide useful additions to the knowledge base. If the overall results were similar, then that would hint towards a more overall disconnection between the importance of risk factors and their use in the credit management process.

Provided results could be confirmed, research could be focused on how to specifically address the areas for improvement, i.e. how to operationalize them and to develop a detailed proposal for such a system. This could then be tested based on action research

utilizing a before and after implementation analysis or by creating a group within a credit function utilizing the system and a control group not utilizing the system.

Finally, less focused on the implementation and still provided the results of this study can be confirmed, a further interesting avenue for research would be to investigate the causes behind these identified potential areas for improvement.

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Appendix 1: Summary of supporting literature regarding risk factors	
LBO cycle	a) Axelson et al. (2013, 2010) show changes in the financing structures of LBOs over time and indicate that firm characteristics are not a driver of leverage in LBOs, while the activity shows significant cyclical patterns. b) Acharya et al. (2007) compared the most recent LBO cycle with the previous LBO cycle and demonstrated that in both cases, a bank's ability to redistribute risks played an important role. Demonstrate high purchase multiples and leverage measures at peak. c) Deutsche Bundesbank (2007): Highlighted an increasing use of back-ended facilities and increased leverage at the same time as covenant levels decreased. d) Deutsche Bundesbank (2006): Saw warning signals of an overheated market. e) Kaplan/Schoar (2005) based on their analysis of PE performance found suggestive evidence that there are pronounced LBO cycles (based on fund-flows). f) Kaplan/Stein (1991) showed that towards the end of the previous LBO cycle (early 1990s) the debt market had evolved towards more back-ended structures. **Summary:** LBO cycle is present and influences several other risk factors, which impact both default risk and recovery risk.
Sponsor Quality	a) Gao (2014) found substantial performance contributions from the involvement of PE firms in LBOs. b) Liu (2013) finds no direct contribution from PE firms to performance, but states that LBOs with high reputation PE firms are more likely to be exited successfully. c) Acharya et al. (2013, 2008) showed that PE-firms that get involved deliver stronger performance, the source of which depends on the skills of the partner. d) BCG/IESE (2010): Increasingly, the engagement of a PE-firm in the fundamentals of the business is seen as a value driver. e) Brinkhuis de De Maeseneire (2012): Showed that there is a relationship between bank debt levels and the reputation of a PE; suggesting

	that strong reputation is viewed as a risk-mitigating factor. f) Hotchkiss et al. (2012) show that financial distress is more likely to result in going concern and tends to be resolved faster if PE firms are involved. g) Cao, Mason and Song (2010) show that during the time of strong credit supply, high quality sponsors kept focusing on stronger businesses. h) Cohn and Towery (2013) show that private companies post LBO increased leverage and sales, therefore sponsors removed a growth barrier. i) Cohn, Mills and Towery (2014) could not find support for the claim that sponsors contributed to performance improvements. j) Demiroglu (2008) demonstrated that the reputation of the investor reduces the risk of a company experiencing financial difficulties. k) Cotter and Peck (2001) showed that transactions with high reputation PE-firms also show more aggressive characteristics but are less likely to default. l) Denis (1994) compared to highly leveraged transactions and concluded that the LBO showed better performance, which he attributed to the organizational form of an LBO. By inference, a high quality sponsor must be expected to be in a better position to implement such structure. m) Opler (1993) tested and found support for the hypothesis that PE-firms reduce the cost of borrowing to support the overall argument that PE-firms can protect interest of debt providers. **Summary:** a) - f) show importance for default risk; g) indicates importance for recovery risk. Importance for recovery risk can also be inferred, e.g. from c, as it is likely that the expected behaviour of a PE-firm will be taken into account in bank lending decisions.
Type of Transaction	a) Wang (2012) found that secondary buyouts show higher prices (compared to primary buyouts) and that while EBITDA increases strongly in absolute terms, profitability and asset efficiency ratios (EBITDA/fixed assets) decline. b) Bonini (2012) found little further improvements in operating performance in secondary buyouts but higher leverage and less liquidity. c) Brinkhuis and De Maeseneire (2012) showed that secondary buyouts show higher leverage than primary transactions.

	d) Sousa and Jenkinson (2010) compared the performance of secondary LBOs to IPO and found that IPO firms perform stronger. Asset efficiency reduces in both cases, but stronger in secondary LBOs. e) Bergström et al. (2007) found a tendency for secondary buyouts to deliver lower improvements in performance, albeit this was not statistically significant. f) Deutsche Bundesbank (2007) reported that secondary and tertiary transactions are financed with higher debt multiples. **Summary:** a) – f) highlight the importance for default risk, based on more debt (see below) and lower improvements in operating performance. Importance for recovery risk can be inferred. In the case of a default, more debt means that the economic value is distributed amongst more debt claims, lowering recovery rates (ignoring any seniority aspects). Unreached performance targets (b) make a trade sale/going concern sale more difficult.
Leverage	a) Halpern et al. (2008) concluded that debt structure and debt loads are important determinants of a default. b) FSA (2006) stated that leverage ratios are high and not prudent and some defaults are likely. c) Deutsche Bundesbank (2006) saw the rise in the debt/Ebitda ratio as a warning sign. d) Andrade and Kaplan (1999) performed an analysis of the factors contributing to financial distress in LBOs. The dominant factor they found was leverage. e) Asquith et al. (1994) investigated the contributing factors to distress in the high-yield market. Albeit other factors were more important, 21% was still contributed from leverage. **Summary:** Generally accepted as a risk factor of very high importance for default risk. The studies above support this. Importance for recovery risk can be inferred. In the case of a default, more debt means that a higher proportion of debt shares into the economic value of the business.
Financial Covenants	a) Axelson et al. (2013, 2010) found a correlation between debt market conditions and leverage. Debt market conditions were also tested using a qualitative measure "tightening", of which covenants were one factor. b) Liu (2013): Found that tight financial covenants are found in transactions that show higher improvements in operating performance / and

	are related to successful exits. c) Demiroglu (2008) found that covenants confer useful rights in the monitoring of transactions. d) Acharya (2007) stated that towards the end of the last LBO cycle some deals have had little covenant protection and that this could be a reflection of aggressive lending policies. e) Deutsche Bundesbank (2007): Pointed out that a lender's rights are negatively impacted by looser covenant structures. f) Cotter/Peck (2001) stated that PE houses not controlled by an experienced PE-firm would benefit from constraining debt terms. g) Carey and Gordy (2007) found that a higher proportion of bank debt leads to higher recovery rates, which they argue is partially based on the rights provided by covenants. h) Khieu and Mullineaux (2009) argue that financial covenants are positively linked to recovery rates. **Summary:** a), c) show that in more optimistic credit markets, covenants are looser. This is likely a reflection of more aggressive lending, i.e. less concern about a default risk. b) and d) point at the monitoring effect of covenants. Generally, covenants provide a means for intervening at an early stage, which is also relevant for default risk. f) and g) support importance for recovery risk, which can also be inferred. If no means to step-in against adverse developments exists, this is likely to impair the economic value of the business for a longer period of time.
Debt composition	a) Demiroglu (2008) found that larger shares of bank debt as part of the overall debt package is associated with fewer defaults. b) Halpern et al. (2008) found that larger shares of private debt (which mainly is bank debt) is associated with fewer instances of financial distress. c) Deutsche Bundesbank (2007) highlighted that long-dated instruments are likely to show lower rates of recovery. **Summary:** a), b) support importance for default risk. c) supports importance for recovery risk.
Jurisdiction	a) Franks et al. (2004) found substantial differences in the recovery rates between countries. b) Grunert and Weber (2008): provide a summary of other studies on recoveries by country that suggests substantial differences. **Summary:** Studies support importance for recovery risk.

Collateral	a) Grunert and Weber (2008) highlighted the importance of collateral as a driver of recovery rates. b) Franks et al. (2004) clearly showed the impact of collateral on recovery rates. c) Bos et al. (2002) found that collateral and debt cushion (debt below a group of lenders) are the most important contributors to recovery. d) Gupton (2000) saw collateral as a main driver of recovery rates. e) Asquith et al. (1994) found that a bank's decision to support a business is not solely based on company fundamentals. This makes collateral an even more important consideration of the credit management LBO cycle. **Summary:** Studies support importance for recovery risk.
Industry State	a) Acharya et al. (2007, 2005) highlighted that recovery rates might well be lower in industries that are depressed because potential strategic buyers may not be able to fund takeovers as an exit route. Except where industries are in distress, there are no significant differences between sectors (except Utilities). b) Franks et al. (2004) did not find a significant influence of the industry on recovery rates. **Summary:** Opposing views, but argument that recovery rates are lower in depressed sectors is plausible.
Overall State of the Economy	a) Khieu/Mullineaux (2009) found that good macroeconomic conditions support recover rates. b) Grunert/Weber (2008) found no significant impact of economic activity on recovery rates. c) Archarya (2007) was unable to confirm significant influence from macroeconomic conditions on recovery rates. d) Franks et al. (2004): Viewed overall status of the economy as a factor worth considering, but not highly relevant. Based on their recovery rates during different timeframes one can infer that recoveries are lower in a recessionary environment. e) Bos et al. (2002) show lower recoveries are present in recessionary times. **Summary:** Appears to be of some relevance, albeit not a dominant factor.

Table A1: Summary of supporting literature regarding risk factors.

Source: Author's own based on the review of relevant literature.

Appendix 2: Final Questionnaire

Contact:	Karsten Frankfurth Tel.: xxxxxxxxxx Email: xxxxxxx@xxxxxx.de
Purpose:	Empirical Part of a Doctoral Research Project
Date:	XXXXXX
Participant Area of Expertise and Years of Experience with LBOs	XXXXXX

Important Information: This research interview/questionnaire is part of a doctoral project at Edinburgh Business School, Heriot-Watt-University. The subject of the research is to investigate how LBO exposures could be managed more effectively by credit functions. Before commencing the interview/questionnaire, please make sure you read and agree to the research rules and that you understand the explanations outlined below.

Research Rules

- Your name as a participant/respondent in this research will not be recorded in the questionnaire and it will not be released to any other person unless you specifically agree or request to be mentioned as a participant/respondent. Data regarding you as an individual (i.e. field of work, years of experience) that is recorded in the questionnaire will only be processed in an anonymous format.

- You are under no obligation to answer any questions. If you prefer not to answer a question or if you are unable to answer a question, just say so. You may also abort the interview at any time.

- You have been selected as a potential participant in this research due to the view that you have substantial experience in the LBO market. The purpose of this research is to receive a generic picture. Therefore, it is important that you provide your answers in terms of **your personal** view of how something is generally done in practice by credit functions. This means that the view you have expressed should not be that of any specific organisation, nor should it be how a specific organisation does something. Instead, the questions are based on your view as to how important certain factors are and how much weight is given to them when people (performing credit work) do credit analysis or monitoring and to what degree they take into account aspects of portfolio management. However, you may want to check with your employer in advance if you think your participation in this research could be a concern.

- One purpose of this interview/questionnaire is to validate whether the questions are clear and can be used for a wider group. Comments regarding the questions themselves are therefore particularly welcome.

- Prior to the publication of the thesis, you may withdraw your participation in the research by giving notice to the above-mentioned contact person. Provided your questionnaire can be identified (it does not carry your name) based on the responses that you have given, it will be destroyed.

- As a participant in the research, you may request a free hard copy of the thesis if and when it is published. If you wish to receive this document, please indicate so to the interviewer. Your name will be registered on a list separate from the questionnaire and will not be matched against the questionnaire. Over time this list will also include the names of non-participants, hence your participation in the interview cannot be inferred from you having received a copy of the thesis. Once all requests to receive a thesis have been met, the list will also be destroyed.

Explanations

The explanations provided below are listed in the same order in which they appear in the questionnaire instead of alphabetical order.

- **Credit risk** within this questionnaire refers jointly to default risk and recovery risk.

- **Credit Analysis** means the analytical work that is performed as part of a new LBO exposure to be entered into or the evaluation of a major amendment of an existing exposure.

- **Credit Monitoring** refers to the analytical work performed as part of the regular review process of LBO exposures.

- **Default risk** refers to the risk that a borrower in an LBO transaction is unable to meet its financial obligations in the contractually agreed manner.

- **Recovery risk** means the risk that the amount of principal outstanding and/or unpaid interest that can be recouped once a default has occurred is low.

- **Portfolio Management** refers to the analytical work performed to put individual credits into perspective against their peer-group, to detect trends and patterns in credit quality. The overall aim of these activities is to avoid concentration risks and the early recognition of deteriorating credits and a deteriorating credit environment. Please remember that the viewpoint is that of a credit function and not of a centralisedd portfolio management group.

- **LBO cycle** refers to a claim that LBO activity follows pronounced cycles which show certain characteristics (i.e. development of purchase prices) which repeats itself over time. The overall assumption is that at peak times, LBO transactions exhibit higher credit risk.

- **Sponsor quality** refers to the ability of a private equity investor to successfully lead an LBO transaction so that default is avoided and to the ability of the sponsor to provide support (in whatever form) to an LBO transaction if it experiences financial distress.

- **Type of transaction** refers to the question of whether a transaction represents a first-time transaction (Primary transaction) or whether the business is undergoing an LBO repeatedly (Secondary or Tertiary Buyout) or whether the private equity investor is taking out a special dividend (so-called Recap).

- **Leverage** describes the share of debt in the overall capital structure of an LBO transaction. Frequently, this is measured by the ratio of debt/ebitda, but other measures are used as well.

- **Financial covenants** are contractually agreed financial ratios that a borrower needs to adhere to during the life of a loan contract.

- **Debt composition** refers to the structure of the debt within an LBO transaction. Typically, LBOs have debts consisting of different layers with regards to maturity, seniority and investor group.

- **Jurisdiction** refers to the question of which country's legal system is the most applicable in a distressed situation.

- **Collateral** is security provided as credit protection against a loan.

- **Industry state** is the overall financial condition of a group of companies within one industry.

- **Overall state of the economy** is a measure of the performance of the economy relevant to an LBO transaction, normally measured as GDP growth.

1. General Questions

1.1 How would you describe the experience that banks have had in the leveraged loan market over the last decade and in particular since the outbreak of the financial crisis in 2007?

1.2 In your view, what are the most important factors contributing to default probability and to recovery risk in LBO transactions?

1.3 In your view, what are the factors that people performing the credit analysis and monitoring mainly focus on when evaluating LBO transactions? If there are discrepancies between the factors mentioned in 1.2, please explain why you think these discrepancies exist.

1.4 In your view, is there anything that the banks and in particular their units in charge of evaluating credit risks should do differently? If so, what and how?

1.5 Do you think that an LBO cycle exists and are there signs that you would describe as signalling an "overheated" market?

2. Risk Factors

2.1 Potential LBO cycle

2.1.1 How would you rate the importance of the LBO cycle on the credit risk (default risk & recovery risk)? If you are of the opinion that no LBO cycle exists, then please leave the question blank.

Rating: **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.1.2 Could you please briefly explain why you have answered as you have done?

2.1.3 To what degree do you think the LBO cycle is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. point in the LBO cycle, concentration of transactions by vintage year, etc.?)

Rating "taken into account" 	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of portfolio management					

2.1.4 Could you please briefly explain your answer?

2.1.4.1 If the degree to which the LBO cycle is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.1.4.2 If the degree to which the LBO cycle is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.1.5 Is there anything else you want to say about the importance or role of the LBO cycle when evaluating LBO transactions?

2.2 Sponsor Quality

2.2.1 How would you rate the importance of sponsor quality on the credit risk (default risk & recovery risk)?

Rating: / **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.2.2 Could you please briefly explain why you have answered as you have done? How do you think sponsor quality could reasonably be measured?

2.2.3 To what degree do you think sponsor quality is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor?

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of portfolio management					

2.2.4 Could you please briefly explain your answer?

2.2.4.1 If the degree to which sponsor quality is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.2.4.2 If the degree to which the sponsor quality is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.2.5 Is there anything else you want to say about the importance or role of the sponsor quality when evaluating LBO transactions?

2.3 Type of transaction

2.3.1 How would you rate the importance of the type of transaction on the credit risk (default & recovery risk)?

Rating: **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.3.2 Could you please briefly explain why you have answered as you have done? What types of transactions would you see as more risky than others and why?

2.3.3 To what degree do you think the type of transaction is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. transaction parameters related to the peer group of Transaction Types, Experience with Types of Transactions so far, Total Exposure in any type of transaction, etc.?)

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.3.4 Could you please briefly explain your answer?

2.3.4.1 If the degree to which the type of transaction is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.3.4.2 If the degree to which the type of transaction is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.3.5 Is there anything else you want to say about the importance or role of the type of transaction when evaluating LBO transactions?

2.4 Leverage

2.4.1 How would you rate the importance of leverage (debt load) on the credit risk (default & recovery risk)?

Rating:	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.4.2 Could you please briefly explain why you have answered as you have done? What leverage (total vs. senior) do think is the more relevant figure from a banking viewpoint?

2.4.3 To what degree do you think leverage is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. clusters of transactions with certain debt loads, comparison to peer-groups, etc.?)

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.4.4 Could you please briefly explain your answer?

2.4.4.1 If the degree to which the debt load is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.4.4.2 If the degree to which the debt load is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.4.5 Is there anything else you want to say about the importance or role of the leverage when evaluating the credit risk in LBOs?

2.5 Financial covenants

2.5.1 How would you rate the importance of financial covenants on the credit risk (default and recovery risk)?

Rating:	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.5.2 Could you please briefly explain why you have answered as you have done? Which type of covenants do you think are of particular importance in this regard?

2.5.3 To what degree do you think financial covenants are taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. levels compared to the average in the portfolio, quality of the covenant package)?

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.5.4 Could you please briefly explain your answer?

2.5.4.1 If the degree to which financial covenants are taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.5.4.2 If the degree to which financial covenants are taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.5.5 Is there anything else you want to say about the importance or role of the financial covenants when evaluating LBO transactions?

2.6 Debt Composition

2.6.1 How would you rate the importance of debt composition on the credit risk (default risk & recovery risk)?

Rating: / **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Default risk					
Recovery risk					

2.6.2 Could you please briefly explain why you have answered as you have done? Are there any constellations of debt composition that you would describe as particularly risky?

2.6.3 To what degree do you think debt composition is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. overall exposure to tranches, clustering of complexities in structures etc.?)

Rating "taken into account" / **Role in:**	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.6.4 Could you please briefly explain your answer?

2.6.4.1 If the degree to which debt composition is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.6.4.2 If the degree to which debt composition is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.6.5 Is there anything else you want to say about the importance or role of debt composition when evaluating LBO transactions?

2.7 Jurisdiction

2.7.1 How would you rate the importance of the jurisdiction on the recovery risk?

Rating: / **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Recovery risk					

2.7.2 Could you please briefly explain why you have answered as you have done?

2.7.3 To what degree do you think the jurisdiction is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (concentration of transaction in jurisdictions, clustering of jurisdictions by lender friendliness etc.?)

Rating "taken into account"	To a very high degree (5)	To a high degree (4)	To some degree (3)	To a very limited degree (2)	Not taken into account at all (1)
Role in:					
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.7.4 Could you please briefly explain your answer?

2.7.4.1 If the degree to which jurisdictional aspects are taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.7.4.2 If the degree to which jurisdictional aspects are taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.7.5 Is there anything else you want to say about the importance or role of jurisdictional aspects when evaluating LBO transactions?

2.8 Collateral

2.8.1 How would you rate the importance of collateral on the recovery risk?

Rating:	Very Important (5)	Important (4)	Some Importance (3)	Very Limited Importance (2)	No Importance at all (1)
Influence on:					
Recovery risk					

2.8.2 Could you please briefly explain why you have answered as you have done? Is there any type of collateral that you would find particularly useful or not?

2.8.3 To what degree do you think collateral is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis

and monitoring take into account aspects of portfolio management relating to this factor (i.e. type of collateral, value developments etc.?)

Rating "taken into account"	To a very high degree (5)	To a high degree (4)	To some degree (3)	To a very limited degree (2)	Not taken into account at all (1)
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.8.4 Could you please briefly explain your answer?

2.8.4.1 If the degree to which collateral is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.8.4.2 If the degree to which collateral is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of credit risk and how do you think this could be achieved?

2.8.5 Is there anything else you want to say about the importance or role of collateral when evaluating LBO transactions?

2.9 Industry state

2.9.1 How would you rate the importance of the industry state on the recovery risk?

Rating:	Very Important (5)	Important (4)	Some Importance (3)	Very Limited Importance (2)	No Importance at all (1)
Influence on:					
Recovery risk					

2.9.2 Could you please briefly explain why you have answered as you have done?

2.9.3 To what degree do you think the industry state is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit

analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. number of transactions in an industry that could easily go into distress, which industries are likely not to have financial resources to rescue companies on a going concern basis, etc.?)

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.9.4 Could you please briefly explain your answer?

2.9.4.1 If the degree to which the industry state is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.9.4.2 If the degree to which the industry state is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of recovery risk and how do you think this could be achieved?

2.9.5 Is there anything else you want to say about the importance or role of the industry state when evaluating LBO transactions?

2.10 Overall State of the Economy

2.10.1 How would you rate the importance of the overall state of the economy on the recovery risk?

Rating: **Influence on:**	**Very Important (5)**	**Important (4)**	**Some Importance (3)**	**Very Limited Importance (2)**	**No Importance at all (1)**
Recovery risk					

2.10.2 Could you please briefly explain why you have answered as you have done?

2.10.3 To what degree do you think the overall state of the economy is taken into account when credit analysis or credit monitoring activities are performed and to what degree do credit analysis and monitoring take into account aspects of portfolio management relating to this factor (i.e. transactions that have assets that are highly sensitive to economic fluctuations)?

Rating "taken into account"	**To a very high degree (5)**	**To a high degree (4)**	**To some degree (3)**	**To a very limited degree (2)**	**Not taken into account at all (1)**
Credit Analysis					
Credit Monitoring					
Analysis/Monitoring takes into account considerations of Portfolio Management					

2.10.4 Could you please briefly explain your answer?

2.10.4.1 If the degree to which the overall state of the economy is taken into account is (4) or five (5) in any area, where do you see this coming in practically and do you think there is room for improvement/a more systematic way to consider this?

2.10.4.2 If the degree to which the overall state of the economy is taken into account is (3) or less, do you think that an increased consideration would contribute positively to the management of recovery risk and how do you think this could be achieved?

2.10.5 Is there anything else you want to say about the importance or role of the state of the overall economy when evaluating LBO transactions?

3. Integration with Credit Analysis, Monitoring and Portfolio Management

3.1 In your view, overall, are LBO exposures analysed with regards to their characteristics and compared to a wider portfolio?

(Yes) (No)

3.1.1 If "Yes" to 3.1, please explain how is this done.

3.1.2 If you answered "No" to the above,

- could you please explain what the reasons are in your view.

- do you think this would be worth the exercise and if so, how could this practically be achieved?

3.2 Would you prefer any specific measure for the purposes of portfolio management? If so, please explain why.

4. Other Remarks

4.1 Is there anything else you want to state about the credit risk and the management of such exposures?

4.2 Is there anything else you think should be added to this questionnaire/any further suggestions for the research?

Appendix 3: Process details qualitative data analysis and examples of summary notes

During the interviews, notes were taken and subsequently summaries in English language were produced. From these summaries, the researcher formed response categories following a careful analysis of the content. The categories were based on comments relating to the same subject, i.e. those that could be summarised by a common heading. Gillham (2000) describes a similar procedure. Gillham also states that the focus should be on the substantive data. For this research, the focus has been on the key points that participants mentioned during the interview process.

Sometimes, interviews conducted later in the process led to additions of categories or to revisions of previously defined categories where new themes were discovered. For each of the questions a response grid was formed and maintained in a Word file. The example illustrated in this Appendix relates to question 1.5 (Appendix 2, p. 154) of the questionnaire. The content of the file for the LBO cycle is shown on the next page.

Response Category Grid Question 1.5 (LBO Cycle)									
	Existence of a cycle	**Weaker documentation standards**	**Increase in Purchase Multiples**	**More risks being distributed**	**Leverage**	**More Secondary/Tertiary Transactions**	**LBOs of unsuitable businesses**	**Lack of consistent / systematic monitoring at credit function level**	**Mitigated by other factors**
IW1	Cycle exists	Documentation standards erode	Purchase multiples go in tandem with leverage.	Currently, syndication market is definitely back. Documentations allow for "free selling".	Shortly after the crisis, a transaction with 5x EBITDA was placed; all B-structures come back to the market.			Limited at this level	
IW2					Typical sign is that de-leveraging is only possible in growth scenarios.			No influence on this once a deal is transacted.	
IW3	Cycle exists		Strong cyclical changes in purchase multiples.					Area for wider portfolio-management.	Transactions may be sold because they deteriorate but not because the overall market is aggressive.
IW4	Cycle exists	Documentation standards erode (in upward cycle)		Driven by institutional investors, who have different refinancing sources and can invest more on a long-term basis.					
IW5	Cycle exists		Higher purchase multiples observed in	More risks can be sold.	Higher Leverage	More secondary and tertiary transactions occur.			

Response Category Grid Question 1.5 (LBO Cycle)									
	Existence of a cycle	**Weaker documentation standards**	**Increase in Purchase Multiples**	**More risks being distributed**	**Leverage**	**More Secondary/Tertiary Transactions**	**LBOs of unsuitable businesses**	**Lack of consistent / systematic monitoring at credit function level**	**Mitigated by other factors**
			upward markets.						
IW6	Cycle exists			Strong appetite for LBOs / many participants.	In an upward market, there is little equity left in the structure				
IW7	Cycle exists			Main driver is availability of cheap financing.					Exiting from the cycle before it reaches its peak difficult to do in practice, focus still on individual business performance.
IW8	Cycle exists			Driven by market liquidity.					Market strongly driven by liquidity, as long as liquidity is in the market transactions can be made.
IW9	Cycle exists	Weaker documentation standards.		There is lots of money waiting for opportunities. (comment: in the debt market).	Lower equity contribution occurs, leverage is higher	Strong emergence of secondary/tertiary transactions.			
IW10	Cycle exists	Weakening of documentation standards.		Strong lending capacity in the last cycle.	Excessive leverage by long-term standards.	Overall overheated market (with view to tertiary transactions)		Clusters of transactions are considered, but more by central portfolio	Focus is on the company.

Response Category Grid Question 1.5 (LBO Cycle)									
	Existence of a cycle	**Weaker documentation standards**	**Increase in Purchase Multiples**	**More risks being distributed**	**Leverage**	**More Secondary/Tertiary Transactions**	**LBOs of unsuitable businesses**	**Lack of consistent / systematic monitoring at credit function level**	**Mitigated by other factors**
								management groups.	
IW11	Cycle exists	Covenant-lite structures already in the market, more in an aggressive market.			Typically, leverage goes up but at present the banking market is very robust.				Important to build ones own opinion. Transaction not declined because done in too aggressive market.
IW12	Cycle exists								Many implications; other aspects are considered.
IW13						The market then shows a fast evolution of transactions with a lot of "churning".		Only a sector view and the developments of these sectors, but not a view on a specific product and how viewed.	
IW14				There are many participants in the upward market.	Low equity contribution.			Recognizing the cycle would require constant monitoring which does not take place and would require substantial experience.	
IW15	"Erratic moves in certain factors, but different							This requires anticipation of certain developments, which is not done to	Erratic moves…but different sources.

Response Category Grid Question 1.5 (LBO Cycle)									
	Existence of a cycle	**Weaker documentation standards**	**Increase in Purchase Multiples**	**More risks being distributed**	**Leverage**	**More Secondary/Tertiary Transactions**	**LBOs of unsuitable businesses**	**Lack of consistent / systematic monitoring at credit function level**	**Mitigated by other factors**
	sources over time"							this degree.	
IW16	Cycle exists		Higher prices paid.	Depressed margins due to strong competition.	High leverage, low equity contributions.			No systematic monitoring of these factors.	
IW17	Cycle exists	Absence of covenants, loser covenants.		Some banks bid aggressively for the business; based on large appetite for LBOs.	High leverage multiples.		Unsuitable businesses being subject to an LBO.	No full evaluation and consequences drawn, albeit it is considered where the cycle stands.	
IW18	Cycle exists	Structures also become weaker	Higher purchase prices paid.		Strong use of leverage.		Quality of the transactions (the underlying businesses) deteriorates.	No focus on the cycle as such; the cycle on its own does not influence the risk.	Business model takes precedence.
Totals:	15	7	5	11	11	4	2	10	8

The detailed response grid above was then transformed into the category grid shown in the main body of the thesis and in the Appendix 4 (p. 187) for the questions relating to individual risk factors. For the LBO cycle the following grid was displayed based on the analysis of the above:

Overview of major interview results regarding the LBO Cycle			
	No. category hits	% category hits	% of interviewees mentioning category
Existence of a cycle:	15.00	20.55%	83.33%
Signals:			
More risks being distributed:	11.00	15.07%	61.11%
Increase in leverage multiples:	11.00	15.07%	61.11%
Increase in purchase prices:	5.00	6.85%	27.78%
Weaker documentation standards:	7.00	9.59%	38.89%
More secondaries/tertiaries:	4.00	5.48%	22.22%
LBO of unsuitable businesses:	2.00	2.74%	11.11%
Credit Management Process:			
Lack of consistent / systematic monitoring at credit function level:	10.00	13.70%	55.56%
Mitigated by other factors:	8.00	10.96%	44.44%
	73.00	100.00%	

Reproduced Table 4-1: Overview of major interview results regarding the LBO cycle. Source: Author's own. See p. 85.

From the total of the 18 participants, a total of ten response categories were formed. The number of categories does not have to correspond to the number of responses. Another point worth noting is that the total number of interviewees mentioning the categories can exceeds 100%. This is because some interviewees gave responses that would fall into several categories and have been counted as such. Therefore, the response grid also shows how many times a certain category was mentioned in relation to the total mentioning of the categories. In total, in this case 73 responses have been distributed across the categories; most of them relating to the existence of the LBO cycle, followed by "More risks being distributed".

To illustrate how the interview summaries were allocated to the response grid, notes from two interview scripts are shown below here. Comments relating to the interpretation or where further details were viewed required are included in the grey-shaded boxes (italics).

Example 1 Interview Summary

Interview Transcript / Field Notes
Questions Section 1

GENERAL QUESTIONS

On the experience in the LBO Market

- There were three critical points over the last decade I think. The first dip in the market when leveraged credits became difficult was in 2001, post the dot.com bubble. After a short upswing then, the next critical point occurred post 9/11. The market then became aggressive, that is borrower friendly from 2004 onwards and peaked in 2007.

This was on the question relating to the experience in the LBO market. This is one of the nine responses received in relation to question 1.1 and classified as Cyclicality in the LBO Market (see Appendix 4, p. 187).

The borrower friendly structure was clearly visible in the documentation standards. Credit documents became more US-High-Yield bond-style documents and covenants fell away. The rally in the market – with higher multiples all the time – ended abruptly in 2007, with the outbreak of the financial crisis.

*Following discussion on the point above, this was counted as a response to 1.5 for the signals of the LBO market. This entered into as one of the seven responses that stated an upward cycle would lead to weaker documentation standards (*Table 4-1*, p. 85). The allocation was supported by what was then explained below.*

There was a concern that LBOs would be hit hard then, but amazingly, nothing happened for a long time. Anyway, activity did not start again until 2009 in Germany and I think at least in Europe, the picture is similar here. And the first "new" LBOs, were structured extremely conservatively.

This supports the cyclicality argument.

They did not contain an equity cure possibility, and they did require significant sponsor equity, sometimes up to around 50%, so very conservative structures. However, around Mai 2010, we have seen deals coming back to the market containing mezzanine and banks started to do underwriting these transactions again (as opposed to club deals). The senior debt multiple in one deal has been seen in excess of 5; covenant headroom has come to 20-22% again with an upward tendency.

Provides further support for lower documentation standards in an upward cycle; see below.

We also see "all B Structures" coming back to the market. The market develops and changes very quickly these days.

Q: Why do you think this market development is taking place, has nothing been learned from the experience?

A: I think something had been learned, but for a short period of time. Competitive pressures are back in the market and after a few years without new business, some of these teams had a desire to take on new transactions. Also, there is significant pressure from financial sponsors who want to invest funds.

Q: And what are the current trends that you see despite what you have already described:

A: Documentations are still evolving towards typical bond documentations, which have historically been structured according to US law. Actually, not many market participants have detailed experience with this and they are quite complex to structure. Also, the development of can be quite fast.

Q: So in your view, is the market to distribute the risk – the syndication market back?

A: Definitely. Institutional investors, who typically have an appetite for the long-dated, no amortisation tranches have pressure to invest. And also, smaller asset-taker type of banks are back, as outlined before. Also, documentations allow for more or less free selling. Some of them contain a "White-List". That is a list of names to whom the credit maybe sold without seeking prior consent. If an institution to whom another institution

wants to sell is not on the list and an application is made and granted, than that buying institution will be on the list going forward.

*The discussion above has been categorized as "More risks being distributed", as there is a lot of reference to selling in the market/syndicating exposures. This is one of the total of 11 counts for more risks being distributed in response 1.5 to provide a signalling function for an increasingly aggressive LBO market and cyclical momentum (*Table 4-1*, p. 85). In the response grid, this had been entered into with a respective comment for interviewee the interviewee. It had been agreed during the interview process that this best describes the cyclical momentum in the market. As many interviewees, this person did focus mainly on the open question and only provided comments occasionally on those relating to the scoring levels.*

Q: 1.2 In your view, what are the most important factors contributing to default probability and recovery risk in LBOs?

Default Risk: I think an important aspect is the sector. Cyclical sectors which are asset heavy are particularly vulnerable.

The above response has been classified as industry-state, as cyclicality is relating to this and as the interviewee had linked the term with the sector. This is one of the three responses categorized as industry state in response to question 1.2; (see Table 4-3*, p. 89).*

Q/C: Yes, but that is not particular to LBOs? The question was more on the specific drivers of LBOs, instead of the overall credit risk.

A: I think then covenants play an important role. If there is a large business, then covenants maybe adjusted. Also they clearly serve an early warning system.

The interviewee was, without realizing this, projecting to question 2.5 with his response. This was discussed during the interview and caused this to be classified as a response to question 2.5. This is one of the responses accounting for the total of 11 responses that highlighted that financial covenants would provide a mechanism for early intervention when matters deteriorate (Appendix 3, p. 169).

On recovery: Collateral is positive, particularly a share-pledge, since it makes a going

concern sale of the business possible. However, in Germany this does not work very well. For this aspect, the most creditor friendly jurisdiction is Luxembourg. However, recoveries is a subject that is difficult to assess, since most banks have departed from the "hard approach". Rather, every attempt is made to restructure the business without insolvency proceedings.

*The comment led to an entry into the category Collateral in response to question 1.3, so is responsible for the one response received for this category (*Table 4-10*, p. 98). The remainder is interesting commentary, which has been used in the thesis.*

1.2 In your view, what are the factors that people performing the credit analysis and monitoring mainly focus on when evaluating LBO transactions? If there are discrepancies between these factors mentioned in 1.2, please explain why you think these discrepancies exist.

Most important is leverage, and leverage combined with the industry. Capex intensity is also an aspect that is normally associated with credit risk.

The response provided above led to entries in three categories in response to question 1.3. The first one was recorded for leverage and the second one for industry state (as specific sector characteristics were touched on). The third one, however, was classified as business fundamentals as the interviewee also explained that the attitude of the company/sponsor towards capex would be important. Therefore, it was more an aspect of the individual business rather than a sector consideration, albeit the sector has an influence on the capex intensity, but this was not what the interviewee was mainly referring to (the entries were included in Table 4-10*, p. 98).*

The following question was put in between as it fitted the discussion at this point:

Q: And do you think that the overall portfolio one carries plays a role?

I do not think that the overall portfolio is important, but the comparators are the transactions that are in the market currently or most recently. In addition, some sectors (comment: based on business fundamentals) will simply be declined.

1.4 / 1.5: In your view, is there anything that the banks and in particular their units in charge of evaluating credit risks should do differently? If so, what and how? / Do you think an LBO cycle exists and are there signs that you would describe as signalling an "overheated market"?

A: Already answered earlier. Amplitude of the cycle becomes stronger and the periods between them become shorter. Recently spoke to someone who has been in credit for more than 25 years and he said he had probably experienced 4 sharp dips in the market. I have only worked in the credit field for slightly more than 10 years and I would say I saw 2-3 dips. Comment: Explained that business fundamentals played should be detached from the market.

Interviewee referenced the earlier response; there the LBO cycle had been recorded in response to the question 1.1 (experience made by banks). The response to question 1.1 but also this one, clearly confirm that the interviewee thought there was an LBO cycle, which led to an entry in this category. So this is one of the 15 entries for this category in Table 4-1*, p. 85). The response also led to an entry in the category for business fundamentals as in question 1.4 (*Table 4-21*, p. 109) This was decided in the context of the intermitted question above, where the interviewee explained that the transactions are compared against most recent ones.*

2.1 Only Scoring Levels only for these questions, no particular comments.

2.2 Sponsor Quality

Important to avoid default, very limited importance with view to recovery risk.

Explained in the open part, although sponsors frequently take a passive role when it comes to a business that is defaulted. Then the restructuring is largely in the hands of lenders.

The above comments did not lead to entries into any category as they did not relate to credit management.

2.3 Important on Default Risk, Some Importance on Recovery Risk.

However, effect at least on default risk not necessarily negative. Many advantages of a

secondary buyout, for example, there is already set-up a proper reporting needed for bank purposes, the business and its managers are accustomed to work under the constraints of an LBO. (Rest, only crosses).

No comments made to the credit management process. The comment made in general on secondary/tertiary was a minority opinion and therefore has been classified a category for major research results.

2.4 Most important – Scores 5 on both. High importance in credit analysis, monitoring and aspects of portfolio-management are taken into account.

2.5 Financial Covenants, 4 on both. Intrinsically linked, if default occurs, the tighter the covenants the lower the threshold levels. 2.5.2: Leverage, Fixed Charge Cover, ICR and capex limits.

2.6 Very Important for Both.

Upon further discussion, explained that enforcements have been scarce; restructuring is the preferred route. Provided further information on hedging claims and their ranking.

This led to a category "rarely enforced" for collateral. It is one of the eight comments made in this regard (See Appendix 4, p. 187). The remaining information provided was interesting, but not directly related to the questions.

Q: 3 Yes, I think this is done to a degree. Whether this is a decisive factor in the decision making at the level of the credit function, I am not sure.

*Counted as a yes (box was clearly ticked in the survey part of the questionnaire); so one of the responses counting as a yes in relation to question 3.0 (*Table 4-17*, p. 105) albeit in the earlier part of the discussion stated that he thought it was not important. But the question here was more narrow; as it simply asked whether they are analysed with view to a wider portfolio. Whether that was then actually used in the decision making, the interviewee stated himself that he was not sure. Earlier, he made the comment that the transaction is compared to the most recent transactions.*

Example 2 Interview Transcript / Field Notes
Participant: Senior Credit Risk Analyst

GENERAL QUESTIONS

Question 1.1

When Looking at PF-Analysis – one noted that ever more aggressive structures have been followed. "2nd and even 3rd-time buyouts have continued, with a level of aggressiveness in the structures. (*C: PF referred to a portfolio the person had observed over the past years*).

This response was not counted in any of the categories shown for bank's experience; it was more of a description of what signalled a cycle; but did not specifically mention this.

Question 1.2

Too high debt levels, driven by the attractiveness of the business. Very little attention has been given to debt capacity.

*This response was classified into two responses with view to question 1.2 (*Table 4-3*, p. 89). The categories in which this responses are included are "Leverage" (based on high debt levels) and "Issues with business fundamentals" as this ultimately is a driver of debt capacity. The comment for the reason for the high leverage has not been considered in the categorization, as this is not a risk factor in the sense of this research (it may be a cause of it, as reflected in the ability to re-distribute risk in an upward cycle).*

Question 1.3

Credit analysis has been focused on balance-sheet Analysis and modern tools of cash-flow management (C: in relation to debt on balance-sheet). This is fine, but sometimes it was ignored where those cash-flows would come from – partial result ("Teilbetriebsergebnisse") have not been considered anymore. Moreover, Analysis focused on the business-model.

This response was classified into two categories with view to question 1.3 (see Table 4-10*, p. 98). One was the focus on "Leverage" and the other one was on "Business fundamentals". The comment about the source of cash-flows sometimes remaining unconsidered was interesting, but not directly related to this question.*

Question 1.4

Definition of tight trigger-ratios and their consequent monitoring; consequent adherence to lending standards. Sometimes those exist, but frequently deals are still done, because "this one is an different based on….". There is in fact limited accuracy in the planning horizon.

*The comment relating to the limited accuracy of the planning horizon was finally classified as "Deeper analysis with the business fundamentals" as during the discussion the interviewee expressed that more thorough analysis could enhance that accuracy. The comment regarding definition of "trigger-ratios" and consequences to be drawn from this has been classified as "More pro-active management of risks (the interviewee described that there should be threshold levels upon which the risk is managed actively or simply not entered into when introduced (*Table 4-21*, p. 109 for classification).*

Question 1.5

Cycle certainly exists, reflected in higher multiples and increasing numbers of secondary, tertiary transactions.

This response has been classified into four categories with view to question 1.5. These were "Existence of a cycle", "Increase in leverage multiples", "Higher purchase multiples" and "More secondary/tertiary transactions" (see Table 4-1*, p. 85). C: During the meeting it was explained that the comment on multiples related to both leverage and purchase multiples.*

2.1 Credit Cycle

Credit cycle is important both for default risk and recovery risk. Deals transacted in high markets are more likely to default and once they do, are likely to experience lower recoveries. Not taken into account / only short-term view

No entry was made for this comment into any category. The view on the importance for the default risk and the recovery risk as well as the degree to which this was taken into account had been covered by the scoring levels.

2.1.3

Recovery Risk is clearly under-represented in credit analysis and monitoring; not the domain of classical credit functions (not used to perform this kind of performance).

Within the Portfolio-Management Scope, a list of experiences with certain structures in certain periods of time would make sense, but have not seen it.

The response did not lead to a separate category; it was not specific to the credit management process with and its relation to the LBO Cycle. Instead, it provided a general comment that recovery risk is less of an aspect considered than default risk. This has been used as a quote in the thesis (Section 4.2.2, p. 91). The comment on portfolio management has informed the statement in the thesis (relating to little use of aspect of portfolio management). The statement has been taken into account with the responses to question 2.2 (Appendix 4, p. 187).

2.2 Sponsor Quality

Sponsor plays a very important role

Negative Selection

would make sense – List of experience with certain sponsors

This response resulted in two counts for the categories assigned to sponsor quality. One was relating to the potential improvements (Systematic approach based on common criteria) and the other one to "APFM – Only negative selection" (Appendix 4, p. 187).

2.3 Type of Transaction

Secondary transactions much more aggressively structured / more likely to default and less equity cushion available.

Very limited attention given to in analysis and monitoring; some attention given in portfolio-management. However, would make sense, for example standards for secondaries or caps on total exposures/more rigor application.

The response was allocated into two categories. These were "Higher Leverage" in Secondary/Tertiary/Recap Transactions. The comment regarding more use in portfolio management was already made with view to the previous question. The other category was then "No systematic consideration of APFM" as this was what the interviewee was referring to based on the discussion (Appendix 4, p. 187).

2.4 Leverage

Very important for both, for obvious reasons (*default and more sharing*).

Looked at strongly within credit analysis, still in credit monitoring and the transactions within a portfolio are frequently compared based on Leverage.

Within Business-Plans, de-leverage is sometimes forecasted very aggressively – critical evaluation needs to take place. Also in monitoring, a table showing the originally forecast leverage and the actually achieved leverage would make sense.

The response was allocated into two categories. These were "Increased debt burden increases risk to default"; "Systematic consideration as part of PF" (comment: so takes into account APFM) and "Comparison of de-leverage vs. original forecast" (comment: as a proposal for improvement) (Appendix 4, p. 187).

2.5 Covenants

I have had cases where the covenants were structured poorly and those transactions went directly into default.

Regarding recovery risk: Some importance, also recovery risk only comes when default

has actually occurred.

When covenants are well structured, they have a considerable impact on the default risk.

Regarding PM: Only possible, when there many transactions. Small participants in the market that have limited transactions on their books cannot do this.

The response was allocated into one category only: "Provide an early option to intervene" (Appendix 4, p. 187). The comment relating to PM has not been allocated to any category. While it is an interesting comment, it is not generally focused on the market. Moreover, the institutions to which the participants in this study had exposure to all would have had sufficiently large portfolios.

2.6 Debt Composition

Very important on both – have seen cases where junior-debt plays on "destructive" behaviour to receive an advantage.

Considered carefully when in credit analysis.

Not taken into account in credit – monitoring!

Still importantly viewed with regard to portfolio-management

This response was allocated into one category only: "Conflicting views of different lender-groups". The remaining comments were clearly covered by the scoring levels themselves and did not warrant any further allocation into categories.

2.7

Very important – have seen it.

No importance at all in credit monitoring and with view to portfolio-management, "once-in the deal, cannot change it".

This response did not lead to any classification. Arguably, the response could have been allocated into the statement relating to substantial differences between Jurisdictions; but the interviewee was not specific on this. He just stated that it was important without elaborating on the differences of the systems.

2.8 Collateral

Limited Importance – only a soft-factor in negotiations. Little value when enforced.

This response led to an inclusion in the category "rarely enforced" for collateral. Similar comments were made by eight participants (Appendix 4, p. 187). While this was also not directly related to the credit management process it was viewed interesting because it suggests that the value of collateral is not necessarily seen in the liquidation of collateral.

2.9 Industry State

Sector aspects very important

High in Analysis and Portfolio-Management, limited view in Monitoring (because once in the deal, nothing can be done anymore).

No category allocation has been made based on this; as all this information was covered by the scoring levels provided.

2.10 Overall State of the Economy

Very important, also limited view in credit - all areas. Argument "this one is different".

No category allocation was made based on this as all this information was covered by the scoring levels and no additional informational content was seen in the response. The comment referenced as "this one is different" relates to the proposal that this interviewee had made earlier when he suggested that there should be strict guidelines based on key-ratios/threshold levels in the monitoring and analysis of credits.

3. Yes – Based on statistical data – but more important is that conclusions are drawn from this.

Appendix 4: Summary Response Categories to Open Questions

Overview of major interview results regarding banks' experiences			
	No. Category hits	% Category hits	% of interviewees mentioning category
Cyclicality in the LBO market:	9	29%	50%
Main focus on the ability to distribute risk:	9	29%	50%
Significant number of defaults:	7	23%	39%
Lack of understanding for the business:	6	19%	33%
	31	100%	

Overview of major interview results regarding main risk factors			
	No. Category hits	% Category hits	% of interviewees mentioning category
Issues within the business fundamentals:	13	28%	72%
Leverage:	11	23%	61%
Industry State:	8	17%	44%
Deal Structure:	5	11%	28%
Specifically for Recovery Risk			
Collateral:	3	6%	17%
Industry State:	3	6%	17%
Deal Structure:	2	4%	11%
Jurisdiction:	2	4%	11%
	47	100%	

Overview of major interview results regarding the main risk factors used in CA / CM			
	No. Category hits	% Category hits	% of interviewees mentioning Category
Business fundamentals:	13	30%	72%
Leverage:	10	23%	56%
Industry State:	8	19%	44%
Performance against plan / historical performance:	5	12%	28%
Deal Structure:	4	9%	22%
Specifically on Recovery Risk:			
Sponsor:	2	5%	11%
Collateral:	1	2%	6%
	43	100%	

Overview of major interview results regarding"what could be done better"			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Take more independent / long-term view:	9	45%	50%
Deeper analysis of business fundamentals:	7	35%	39%
More pro-active management of risks:	3	15%	17%
More focus on management:	1	5%	6%
	20	100%	

Overview of major interview results regarding the LBO Cycle			
	No. Category hits	% Category hits	% of interviewees mentioning category
Existence of a cycle:	15	21%	83%
Signals:			
More risks being distributed:	11	15%	61%
Increase in leverage multiples:	11	15%	61%
Increase in purchase prices:	5	7%	28%
Weaker documentation standards:	7	10%	39%
More secondaries/tertiaries:	4	5%	22%
LBO of unsuitable businesses:	2	3%	11%
Credit Management Process:			
Lack of consistent / systematic monitoring at credit function level:	10	14%	56%
Mitigated by other factors:	8	11%	44%
	73	100%	

Overview of major interview results regarding Sponsor Quality			
	No. Category hits	% Category hits	% of interviewees mentioning category
Sponsor Track Record:	7	21%	39%
Ability to invest additional funds if needed:	5	15%	28%
Credit Management Process:			
Credit Monitoring: "too late":	3	9%	17%
APFM - "Not in a structured way":	8	24%	44%
APFM - "Only negative selection":	7	21%	39%
Potential for improvement:			
Systematic approach based on common criteria:	4	12%	22%
	34	100%	

Overview of major interview results regarding the Type of Transaction			
	No. Category hits	% Category hits	% of interviewees mentioning category
Higher Leverage in Secondaries, Tertiaries, Recaps:	10	25%	56%
Further benefits more difficult to achieve:	6	15%	33%
Secondaries are "LBO-proven":	6	15%	33%
Loss of Sponsor Incentive in Recap:	2	5%	11%
Tired Management :	1	3%	6%
Credit Management Process:			
No systematic consideration of APFM:	7	18%	39%
Knowledge of higher risk but not decive factor:	4	10%	22%
"Too Late" in CM	4	10%	22%
	40	100%	

Overview of major interview results regarding Leverage			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Increased debt burden increases risk to default:	8	40%	44%
Increased debt at default lowers distributable value:	4	20%	22%
Credit Management Process:			
Comparison based on peer-group:	4	20%	22%
Significant consideration in PF:	2	10%	11%
Proposal for Improvement:			
Comparison of de-leverage vs. original forecast:	2	10%	11%
	20	100%	

Overview of major interview results regarding Financial Covenants			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Provide an Early Option to Intervene:	11	32%	61%
Tight Covenants can Cause Problems:	2	6%	11%
Credit Management Process:			
Structural Aspects Considered:	8	24%	44%
Check Limited to Standard:	4	12%	22%
Use of APFM Limited / Not systematically:	7	21%	39%
Proposals for Improvement:			
Focus on Covenants "tailored" to the Transaction:	1	3%	6%
Clusterin of Covenants:	1	3%	6%
	34	100%	

Overview of major interview results regarding Debt Composition			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Conflicting views of diffrent lender-groups:	10	77%	56%
Credit Management Process:			
Key-point is the intercreditor-agreement:	3	23%	17%
	13	100%	

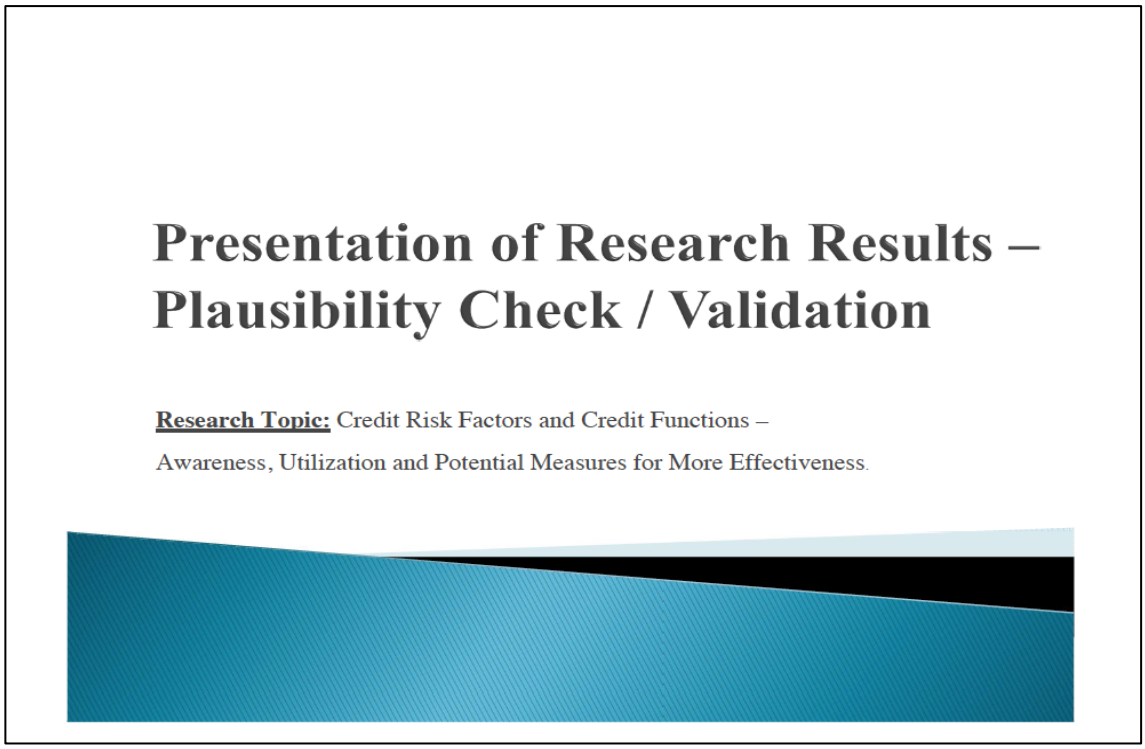
Overview of major interview results regarding Jurisdiction			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Substantial differences in creditor friendliness:	10	59%	56%
Requirement of Knowledge:	3	18%	17%
Credit Management Process:			
Typically Yes/No decision:	2	12%	11%
Only based on broader country limits:	2	12%	11%
	17	100%	

Overview of major interview results regarding Collateral			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Rarely Enforced / Mainly useful for negotiations:	8	100%	44%
	8	100%	

Overview of major interview results regarding Industry State			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Cyclicality major driver of recovery in default case:	8	40%	44%
Credit Management Process:			
Cyclicality an important part of the CPM	8	40%	44%
APFM - Sector Classification	4	20%	22%
	20	100%	

Overview of major interview results regarding the Overall State of the Economy			
	No. Category hits:	% Category hits:	% of interviewees mentioning category
Impact on tolerance levels:	4	57%	22%
Credit Management Process:			
Impact Analysis:	3	43%	17%
	7	100%	

Appendix 5: Presentation used for Plausibility Checks



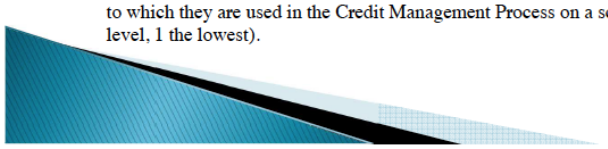
* The version of the presentation shown here is a corrected version that reflects that the research aim was to provide potential measures to address any areas for improvement, but not to provide initial recommendations (see section 4.2, p. 57). No amendments to the content of the conclusions, key-findings and consequences were made.

Important Information

- Your name as a participant in this research will not be disclosed in the thesis and your answers/comments or any quotation thereof will only be used in anonymous format. However, provided you consent, your name as a participant and a summary of your professional responsibilities and experience will be disclosed to Heriot-Watt University.
- You have been selected as a potential participant in this research due to the view that you have substantial experience in the LBO market, i.e. in those transactions that are financed by a number of banks. The purpose of the research is to receive a generic picture on how Credit Functions deal with LBO Credits and to provide some potential measures as to how to address areas for improvement if they can be identified. The research is not focused on a specific organization. For this purpose, a series of expert interviews was carried out and analyzed both quantitatively and qualitatively. The results are summarized in this presentation. Your participation in this research serves to achieve a plausibility check on the results and their interpretation. Therefore, you are requested to provide some comments on the research findings.
- You are under no obligation to answer any questions or provide any comments. If you prefer not to answer a question/provide a comment please just state so. You may also abort the interview at any time.

Background Information on the Research Process

- **Focus of the Research:** Generic picuture as to how Credit Functions deal with LBO Credits generally, i.e. in the market place. No focus on specific organizations or group of organizations. Based on potential areas for improvement, potential measures how to adress these are being provided.
- **Selection of Interviewees:** Based on personal contacts of the researcher; which offered a unique opportunity for the research to be undertaken. Selection of individuals based on substantial experience in the LBO market and with view to achieve a multi-angle picuture.
- **Composition of Interviewees:** LBO-Bankers (Credit Analysts, Structurers and Syndication Professionals): 10 / Rating Analysts: 3 / Debt Advisors with substantial LBO experience: 3 / Finance-Lawyers: 2. Total no. of banks participants had worked for: 13 (either currently or previously; total no. positions with LBO exposure held by participants: 32).
- **Timing of Interviews:** Research Period: March 2011 – March 2012. Average Duration of interview: Generally between 75-90 Minutes.
- **Data-Analysis:** Non-parametric statistical tests and qualitative analysis of responses using response categories. Within the former, respondents were asked to rate the importance of risk factors and the degree to which they are used in the Credit Management Process on a scale of 1- 5 (with 5 representing the highest level, 1 the lowest).

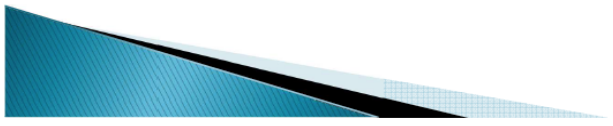


Key-Findings / Conclusions

- **1.) Strong Awareness of Risk Factors:** Overall, there is a strong level of awareness within Credit Functions regarding the Risk Drivers in LBOs. The most important ones according to the literature are: LBO Cycle, Sponsor Quality, Type of Transaction, Leverage, Financial Covenants, Debt Composition, Jurisdiction, Collateral, Industry State and the Overall State of the Economy. In the view of participants, the fundamentals of the underlying business also play a very important role.
- **2.) Financial Structure dominates Default / Recovery Risk:** As particularly relevant drivers of Credit Risk are viewed the business fundamentals, Leverage and Industry State and these factors receive considerable attention in the work of Credit Functions. However, in the recent boom of LBOs, business fundamentals appeared to have little influence on the Capital Structure of LBOs and the defaults occured in all sectors, mainly atributed to aggressive Capital Structures. Therefore, the analysis did not focus on matching the business fundamentals with the Capital Structure.
- **3.) Herd-behaviour to follow the market:** There is a strong tendency to follow the market view.
- **4.) Clear signs of LBO Cycle:** An LBO Cycle clearly exists and there are observable signs of this market. However, in the Credit Management Process of LBOs, it plays a subordinate role.
- **5.) Analysis Focused on Default Risk:** The work of Credit Functions is much more concerned with Default Risk than with Recovery Risk.

Key-Findings / Conclusions continued

- **6. Lack of consistent consideration of Risk Factors:** While the Risk Factors are viewed important, some of them do not receive the adequate attention in the Credit Management Process. Generally, Risk Factors receive less attention in Credit Monitoring than in Credit Analysis.
- **7. Insufficient integration of Portfolio-Management:** The Risk Factors are rarely viewed within the context of a wider portfolio at the level of the Credit Function; integration with portfolio-management is limited.



Potential Measures to Address Areas for Improvement

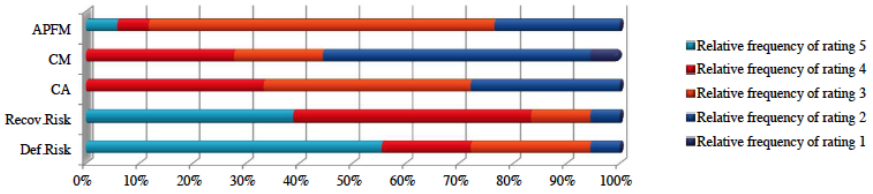
- The Key-Findings would suggest that the following could potentially result in more effective management of LBO Credits by Credit Functions:
  - Assign equal importance to Default Risk and Recovery Risk
  - Benchmark business fundamentals of LBOs *systematically* against proposed Capital Structures.
  - *Systematically* take into account the LBO cycle and detach the view from the current market sentiment.
  - Set minimum standards for the coverage of Risk Factors within the Credit Management Process to ensure that they receive adequate a quantum of attention that is consistent with their importance.
  - Ensure that the Credit Management is sufficiently integrated and that Risk Factors relating to transactions systematically include Aspects of Portfolio Management.

Final Remarks / Contact

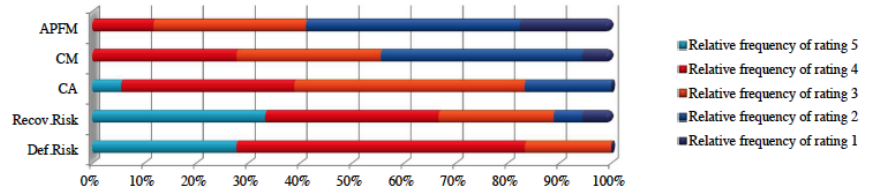
- THANK YOU very much for your time!!!
- Should you have any subsequent thoughts, comments etc. the researcher would be grateful. Please direct any such information to the following address: Karsten Frankfurth; E-Mail: [redacted]

Appendix – Detailed Results

Rating Levels LBO Cycle



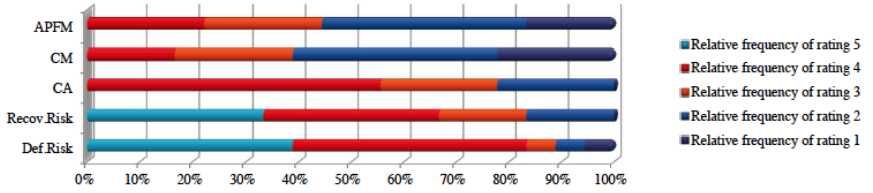
Rating Levels Sponsor Quality



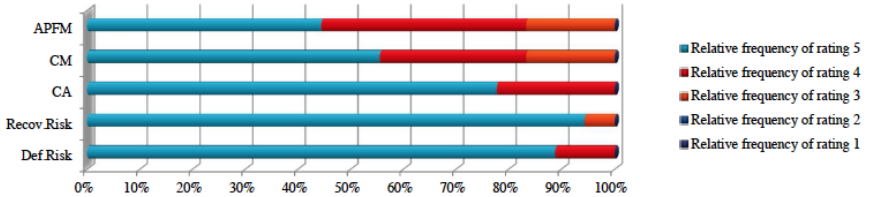
Def.Risk = Default Risk, Recov. Risk = Reocvery Risk; CA = Credit Analysis, CM = Credit Monitoring; APFM = Aspects of Portfolio-Management taken into account.

Appendix – Detailed Results

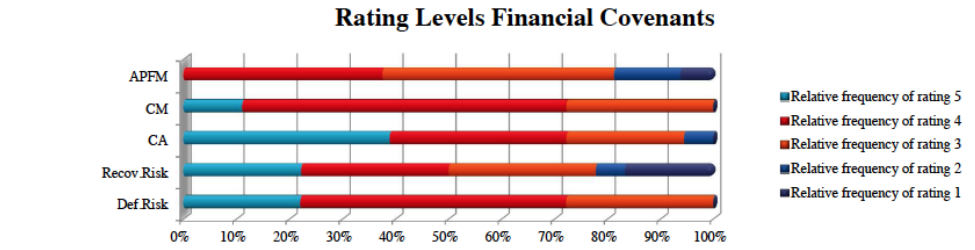
Rating Levels Type of Transaction

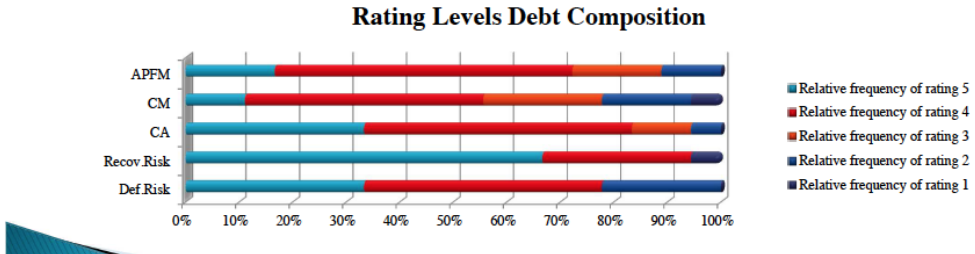


Rating Levels Leverage

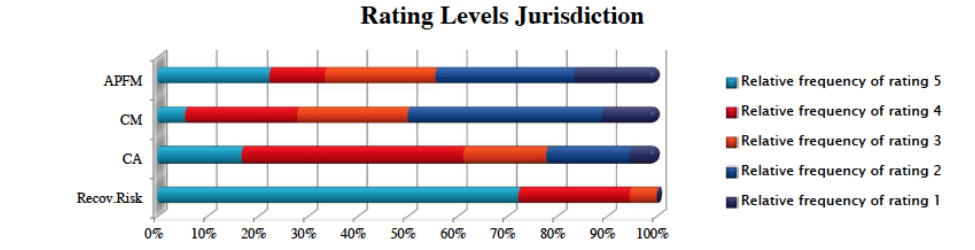


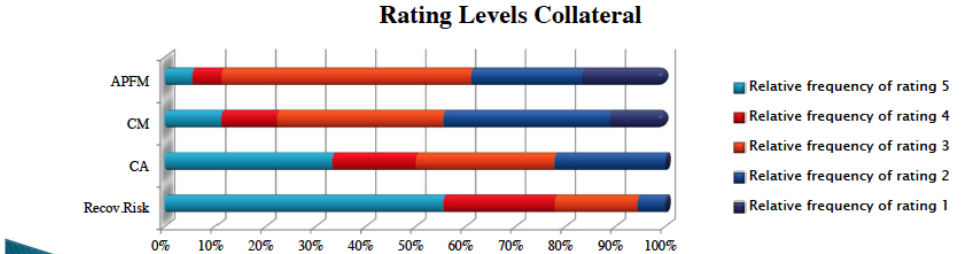
Appendix – Detailed Results





Appendix – Detailed Results





Appendix – Detailed Results